BUREAU OF RECLAMATION
RECORD OF DECISION
FOR
POTHOLES RESERVOIR RESOURCE MANAGEMENT PLAN
Final Environmental Impact Statement
INT-FES 01-40

I. Introduction

This document constitutes the Record of Decision (ROD) of the Department of the Interior, Bureau of Reclamation (Reclamation) Pacific Northwest Region, regarding the alternative selected to provide management guidance for the resources under Reclamation jurisdiction at Potholes Reservoir. The 36,200-acre Potholes Reservoir Resource Management Plan (RMP) study area defines the Reclamation lands and waters which are the subject of the Final Environmental Impact Statement (FEIS), filed with the Environmental Protection Agency (EPA) on December 7, 2001 (FES-01-40). The EPA's notice of availability was published in the *Federal Register* on December 14, 2001. The FEIS was prepared pursuant to the Council on Environmental Quality Regulations for implementing the procedural requirements of the National Environmental Policy Act (NEPA), Department of Interior policies, and Reclamation's NEPA handbook. The FEIS provides an analysis of the potential impacts to the natural resources and human environment related to management changes for Reclamation lands in and around Potholes Reservoir.

II. Reclamation's Decision

Reclamation's decision is to implement the Preferred Alternative (Alternative B) and associated environmental commitments (mitigation measures) as described in the FEIS. Implementing this alternative will balance the management agencies' and public's long-term vision for Potholes Reservoir while recognizing the need to protect the natural and cultural environment and support the overall recreational interests of visitors.

III. The Alternatives Considered

The RMP alternatives evaluated in the FEIS were developed by the Reclamation study team using the input received from the Land Management Agency and Ad Hoc work groups, various state and federal agency representatives, and the public. Each alternative identified specific actions to be taken within specific management areas of Potholes Reservoir as well as actions that are applicable reservoir-wide. The alternatives and themes which emerged are described below.

Alternative A - No Action: This alternative includes the actions and developments likely to occur in the absence of adopting and implementing a RMP for Potholes Reservoir. Many of the actions and developments identified are either required under existing Reclamation or Federal

law, policy, or regulation; are needed to meet applicable state or local regulations; or are authorized by existing management plans and agency policies in effect at Potholes Reservoir. This alternative therefore represents the current and foreseeable management situation at Potholes Reservoir.

Similar to the three "action" alternatives described below (Alternatives B, C, and D), the Washington State Parks and Recreation Commission (SPRC) and Washington Department of Fish and Wildlife (WDFW) will continue to administer and manage the Potholes Reservoir area with oversight provided by the Ephrata Field Office of the Bureau of Reclamation. The Grant County Sheriff's Office will also remain a management partner at the reservoir providing general law enforcement services and periodic patrols within the Grant County Off-Road Vehicle (ORV) Area.

No changes would have been made to motorized travel and ORV management within the RMP study area. The 433-acre "Red Zone" would have remained closed to motorized travel/ORV use year-round; the 1,459- acre "Yellow Zone" would have remained open to motorized travel/ORV use from July 1 to October 1; and the 1,895-acre "Green Zone" would have remained open to motor vehicle travel/ORV use year-round.

Existing roads, trails, and recreation facilities would have been maintained to support current levels of activity with limited improvements made only on an as-needed basis and as funding permits. Required improvements for safety, sanitation, and accessibility for persons with disabilities would have been undertaken as funding allows. Overall, future land use and resource management decisions would have continued on an ad-hoc basis in the absence of a cohesive and comprehensive RMP to guide agency decisions and activities over the 10 year planning period.

Alternative B - Preferred: Alternative B is the Reclamation's preferred alternative. It balances the management agencies' and public's long-term vision for Potholes Reservoir, recognizing the need to protect the natural and cultural environment while supporting the overall recreational interests of visitors. By combining elements and features from Alternatives C and D and the modifications from agency and public review, Alternative B best satisfies the RMP goals and objectives.

A mix of developed recreation areas and "designated" dispersed camping areas will be provided to accommodate the demand for recreation facilities and sites, as well as directing public use to specific areas where environmental damage would be less severe. ORV use restrictions are proposed to improve wildlife habitat, wildlife populations, sand dune integrity, and vegetative cover. This will be accomplished by permanently restricting motor vehicle use in approximately 919 acres of the 1,459-acre "Yellow Zone" currently open seasonally from July 1 through October. The remaining 539 acres of the "Yellow Zone" would still be open seasonally while no changes would occur to the "Red" or "Green Zone".

Alternative C - Preservation and Enhancement: This alternative emphasizes natural resource preservation and enhancement and is the environmentally preferred alternative. The number of developed recreation areas and facilities would have remained essentially unchanged as no new

developments would have been constructed except to meet minimum basic facility needs for sanitation, public safety, and accessibility for persons with disabilities. Compared to the other alternatives, more of the primitive road network would be closed to motorized travel leaving fewer dispersed recreation areas accessible by motor vehicle. Similar to the other "action" alternatives, land use activities would have been focused and managed within environmentally suitable areas to reduce resource impacts and disturbances.

Motor vehicle travel and ORV use would have been discontinued by permanently closing the "Yellow Zone "and a portion of the "Green Zone" located inside the RMP study area. The Grant County ORV Area would have encompassed approximately 1,227 acres of the "Green Zone" located outside the RMP study area boundary.

Alternative D - Recreation Development: With an emphasis on recreation development, this alternative includes the highest number of developed and primitive recreation facilities and sites. Consistent with this management emphasis, ORV opportunities would have been expanded by allowing ORV use along several designated trails leading to the western shore of Moses Lake. The Grant County ORV Area would have encompassed approximately 1,895 acres designated as "Green Zone" (open year-round) inside and outside the RMP study area and 1,459 acres "open seasonally" within the existing "Yellow Zone" and inside the RMP study area. The ORV park size would have remained the same as the "No Action"Alternative and greater access opportunities would have been a specific element of Alternative D. Similar to the other "action" alternatives, land use activities would have been generally focused and managed within environmentally suitable areas to reduce resource impacts and disturbances.

Alternatives Considered but Not Carried Forward: As the alternatives were developed and refined, a number of individual plan elements and features were dropped from further consideration. One such element would have maximized the animal-unit-month (AUM) grazing allocation in North Potholes Reserve. This action was eliminated due to problems with the present grazing regime as well as higher livestock utilization and AUM allocations in a legislatively established State Game Reserve. The reserve is used by a large variety of game and nongame wildlife year-round and is managed for waterfowl production.

Another element eliminated from detailed study involved the establishment of idle speed and no-wake zones on the main reservoir for the purpose of improving boating, shoreline habitat and public safety. This element was eliminated due to recent amendments to Grant County Ordinance 6.08 - "An Ordinance Providing for the Safety of Boaters, Swimmers, and Others Using the Waters of Grant County and Providing Certain Regulations and Restrictions on the Use of Such Waters."

IV. Decision Factors

Alternative B-Preferred is the alternative that best balances the needs and expectations at Potholes Reservoir by providing for future recreation development; controlling access and dispersed camping; reducing the acres of seasonal ORV use, and providing preservation and enhancement of natural and cultural resources. Implementation of Alternative B would facilitate

greater coordination among the many agency programs, plans, and actions as they apply to Reclamation lands in the RMP study area. The plan elements that balance the social and environmental elements of Potholes Reservoir in this alternative are:

Natural Resources

- Alternative B includes additional actions to minimize and correct soil and shoreline erosion problems; restore and protect vegetation, habitat diversity, wildlife, and water quality; and enhance visual quality.

- The water quality oversight panel will review the need for an expanded reservoir water quality and sediment sampling program to determine concentrations of potential contaminants of concern (dieldrin, methoxychlor, etc.) and the effects of mosquito control spraying activities and chemicals on reservoir water quality and biota.

- Develop criteria for the appearance of structures and natural landscape preservation. These criteria would be applied in the planning, design, land use agreements and construction of all new facilities and structures and in the maintenance or modification of all existing facilities and structures.

Cultural Resources

- Work with Native Americans who have interests at Potholes Reservoir to develop and display appropriate interpretive information related to their use of the area and the need to preserve and protect cultural resources.

- If cultural resources found eligible for the National Register are identified on Reclamation lands designated as "open" to ORV use, the Grant County ORV Area boundary would be adjusted to protect identified cultural resources and/or sites.

Recreation

- Alternative B provides for limited recreation development and the maintenance of existing recreation facilities and opportunities to a standard that protects the public and public investment while achieving resource preservation objectives. Future developed recreation areas would be limited to Potholes State Park and O'Sullivan Site - North where a higher level of site and facility development would be provided by the SPRC.

- Dispersed camping would continue to typify public recreation on lands administered by the WDFW.

Land Use and Administration

- **The land use agreement between the WDFW and Grant County to operate and** maintain an ORV Area will be modified to include only those Reclamation lands within the Eastern Dunes management area, the southern portion of the Lower Crab Creek Arm and the south half of T18N, R28E, S10.

Off-Road Vehicle Management

- Limit ORV use within the RMP study area to the Eastern Dunes and the southern portion of the Lower Crab Creek Arm management areas.

- Modify the Grant County ORV Area boundary to include the Eastern Dunes management area, the southern portion of the Lower Crab Creek Arm, 320 acres of Reclamation land outside the RMP study area (T18N, R28E, S10, S1/2), and Grant County ORV Area lands. The "Green Zone" open year-round to ORV use would continue to encompass approximately 1,895 acres.

Grazing Management

- Adjust livestock grazing management as needed to maintain or enhance habitat for identified special status plant and animal species. This may include development of livestock enclosures or restricted use to pastures where grazing systems cannot otherwise be adjusted to accommodate the habitat requirements of a special status species.

- Modify AUM allocations, season-of-use authorizations, and other Grazing Plan stipulations included in renewed permits in order to maintain or improve native rangeland species and attain composition, density, foliar cover, and vigor appropriate to site potential and wildlife management objectives.

Visitor Information and Interpretation

- Provide managed access, turnouts, signs, and/or interpretive trails and displays to enhance "Watchable Wildlife" viewing opportunities.

West Lake/North Outlet: Develop a half-mile loop trail beginning at the North Outlet parking lot. The trail will traverse through shrub-steppe, wetland, and riparian habitats. Wetland crossings will likely involve boardwalk construction.

North Potholes Reserve: Design and develop a system of hiking trails and blinds north of Job Corps Dike to view and interpret the area's colonial nesting bird rookery for great blue herons, black-crowned night herons, great egrets, and double-crested cormorants. The project will also provide excellent opportunities to view shorebirds, Raptores, waterfowl, songbirds, terns, beaver and mule deer.

Public Health and Safety/Environmental Protection

- Under the preferred Alternative B, approximately 18.4 miles of primitive road will be permanently closed to motorized travel.

- Construct trails and boardwalks to control public access and foot traffic through wetland and riparian habitats in high use recreation areas (i.e., within the Developed Corridor).

- Control dispersed camping in environmentally unsuitable or sensitive areas through appropriate access restrictions, seasonal use restrictions, or closure. Manage this use according to the "Recreation" actions described above.

- On the basis of the information gathered, the management agencies will amend or rescind existing management strategies or actions to balance public recreation and resource protection policies, goals and objectives. Opportunities for public review and comment will be provided prior to adopting and implementing future management changes affecting public use.

V. Public Response to the FEIS

The *Federal Register* Notice of Availability of the FEIS was published on December 12, 2001. Copies of the FEIS were distributed to those who had commented on the draft EIS or had returned a form (sent to the entire mailing list) requesting a copy. No additional comments were received.

VI. Environmental Commitments in Implementing the Decision

In addition to the management actions described for the preferred alternative, the following mitigation actions are considered to be commitments made by Reclamation.

Air

- Reclamation will require air quality control measures in construction specifications for any proposed development actions under each alternative.

Soils

- Decreased erosion during construction will be addressed through: planting grasses, forbs, trees and shrubs or placement of rip-rap, sand bags, jute, sod, erosion mats, bale dikes, mulch, or excelsior blankets.
- Clearing schedules will be arranged to minimize the practical exposure of soils.
- Final erosion control and site restoration measures will be initiated as soon as an area is no longer needed for construction, stockpiling, or access.
- Short-term effects such as increased land or shoreline erosion in or near recreation sites will be minimized by adhering to Best Management Practices (BMPs) during construction.

Water Quality

- Expand the reservoir water quality and sediment sampling program. Review the need for routine testing of fish flesh for concentrations of pesticides and heavy metals contamination, and minimize chemical mosquito control methods.

Vegetation

- The use of native species or non-invasive species is recommended for re-vegetation efforts to maximize the potential to restore re-vegetated areas to high quality habitat.
- Construction specifications will require contractors to preserve the natural landscape and prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the work vicinity.
- Critical environmental areas (i.e., stream corridors, wetlands, riparian areas, Ute

ladies'-tresses orchid and gray cryptantha habitat, and steep slopes) will not be used for construction equipment or material storage or stockpiling; construction staging or maintenance; or temporary access roads.

- Upon the completion of construction, any land disturbed but not permanently occupied by new facilities will be graded to provide proper drainage and blend with the natural contours of the land, covered with topsoil stripped from construction areas, and re-vegetated with plants native to the area and beneficial to wildlife.
- The final recommended composition of plant species, seeding rates, and planting dates will be determined in consultation with the WDFW and USFWS (where applicable or appropriate).
- Uplands will be re-vegetated to the native vegetative community appropriate for the site's soil type, topographic position, and elevation.

Wildlife

- Efforts will be made to restore native plant "communities".
- More aggressive weed control plans, above and beyond simple noxious weed control measures, will benefit native plant communities.
- The development of new campgrounds, boat launches, interpretive trails, etc. will take place in areas which minimize adverse impacts to fish and wildlife.
- Special signage, seasonal road closures, firearms or shooting restrictions, and some vegetation management are measures to improve conditions for Washington ground squirrels near Lind Coulee.
- Bald eagle roosts and regular perch sites should be protected with access restrictions.
- Interpretive information should be developed to educate the public on the valuable and unique habitats and associated unique species present and measures being employed to protect them.

Fish

- Prior to any construction or bank stabilization projects, site-specific erosion and sediment control measures will be identified and incorporated into the project's construction specifications, reducing sediment delivery to the reservoir.
- Construction sites will be re-vegetated and riparian areas near shorelines will be planted with trees and shrubs to provide shade and habitat for fish and near-shore wildlife.
- Projects built below the reservoir high water line will be timed for construction to occur when the reservoir pool is at its lowest elevation to avoid damage to fish spawning and rearing habitat caused by the release of sediment into the reservoir or increased turbidity.
- Short-term effects such as increased shoreline erosion in or near construction sites will be minimized by adhering to Best Management Practices (BMPs) during project construction.
- During final layout and site design, measures to minimize asphalt surface runoff and the potential for pollutants (e.g., oil) entering the reservoir will also be identified and incorporated into the design.
- Herbicides used for the control of Eurasian water milfoil and purple loosestrife will

be selected for their low toxicity to aquatic wildlife and fish.

Threatened and Endangered Species

- In consultation with the USFWS, mitigation measures will be developed to minimize adverse impacts where appropriate, to special status species and habitats regardless of the alternative selected.

Cultural

- All identified cultural resources are recorded and mapped to professional standards.
- Whenever possible, cultural resources will be avoided during project implementation.
- Conduct Class III surveys and prepare a Cultural Resource Management Plan (CRMP).
- Coordinate with Native Americans who have interests at Potholes Reservoir to prepare the CRMP and manage cultural resources.

Monitoring

Mitigation actions for some adverse impacts include restoration of native vegetation in various portions of the RMP study area. These restoration efforts will be tied to monitoring and success criteria. That is, if initial restoration actions fall short of goals, additional actions will be necessary. Monitoring plans will be incorporated into each mitigation measure to look at effectiveness of the measure and identify adaptive management that is needed.

VII. Decision

Based on the factors discussed above, it is my decision that Reclamation shall proceed with implementing the Preferred Alternative (Alternative B) as described in the FEIS and this ROD. This alternative best achieves the project goals and objectives and meets the purpose and need of the project in an environmentally sensitive manner. Reclamation will implement the environmental commitments listed in this ROD which will either avoid or minimize adverse impacts associated with the Preferred Alternative.

Approved:

_____ _____

J. William McDonald Date
Regional Director
Pacific Northwest Region

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Potholes Reservoir
Resource Management Plan
Final Environmental Impact Statement

Grant County, Washington
November 2001

U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Boise, Idaho

Upper Columbia Area Office
Ephrata Field Office
Ephrata, Washington

Final Environmental Impact Statement
Potholes Reservoir
Resource Management Plan
Grant County, Washington

Prepared by: US Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Upper Columbia Area Office
Ephrata Field Office
Ephrata, Washington

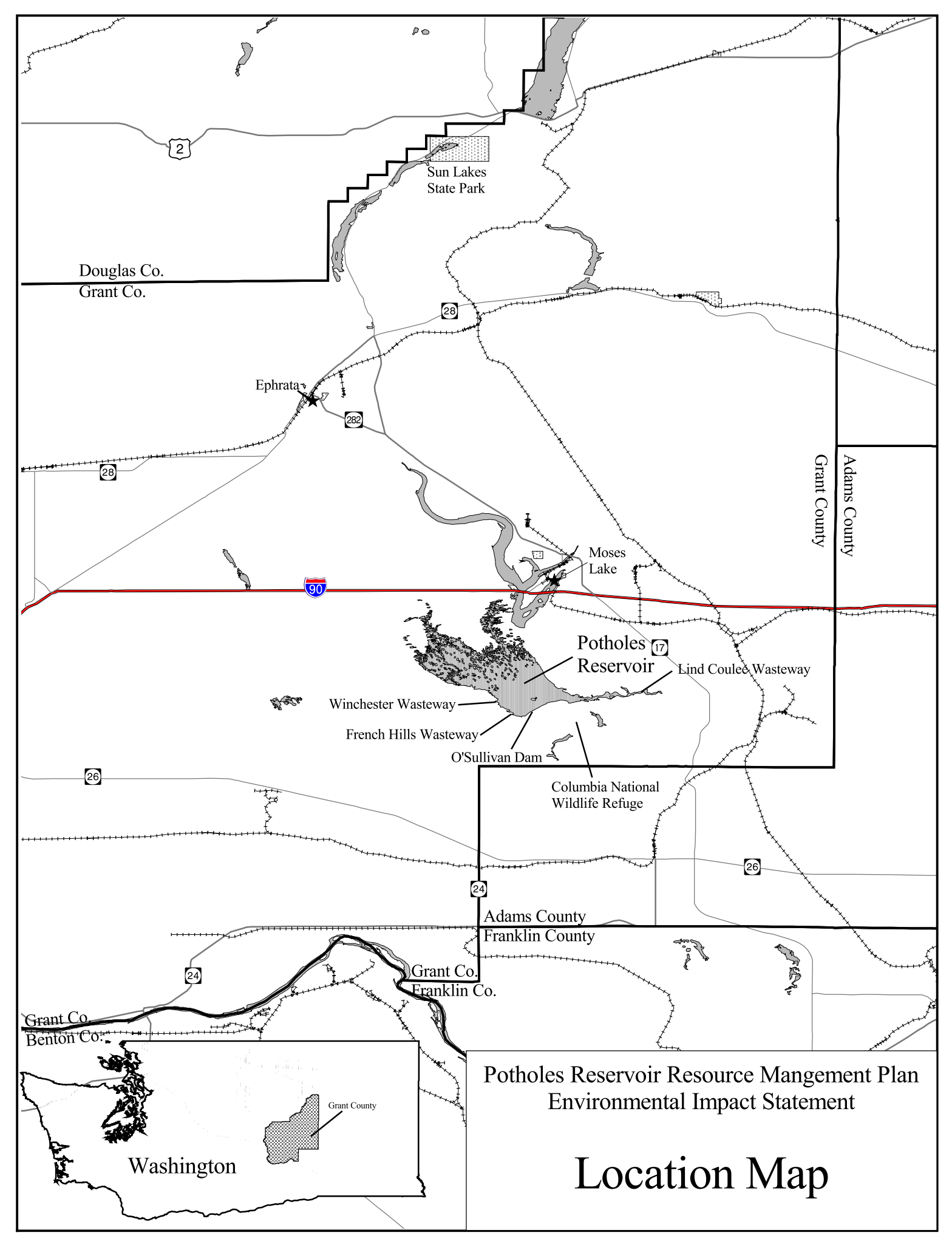
Cooperating Agencies: Grant County
State of Washington

Abstract: This Final Environmental Impact Statement (FEIS) documents the analysis of four alternatives, including a "no action" alternative for resource management in the Potholes Reservoir Study area. The alternatives respond differently to the issues and concerns identified during project planning. The preferred alternative is Alternative B, which balances the management agencies' and public's long-term vision for Potholes Reservoir and recognizes the need to protect the natural and cultural environment while supporting the overall recreational interest of the visitors.

The alternatives evaluated in this Final Environmental Impact Statement were developed by the Reclamation study team using the input received from the Land Management Agency and Ad Hoc work groups, state and federal agency representatives, and the public. The study team developed goals and objectives based on this input which are the underlying framework for the alternatives. Additional input from public and agencies on the Draft Environmental Impact Statement (DEIS) made minor modifications to the alternatives in the FEIS.

This Final Environmental Impact Statement has been developed to comply with the requirements of the National Environmental Policy Act. It also provides the public review required under the Executive Order 11988 (Floodplain Management) and the Executive Order 11990 (Protection of Wetlands).

For Further Information Contact: Jim Blanchard
Bureau of Reclamation
Ephrata Field Office
32 C Street, Bpx 815
Ephrata, Washington 98823
509-754-0226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Sun Lakes
State Park
Douglas Co.
Grant Co.
28
Ephrata
282
28
Grant County
Adams County
Moses
Lake
90
Potholes
Reservoir
17
Lind Coulee Wasteway
Winchester Wasteway
French Hills Wasteway
O'Sullivan Dam
Columbia National
Wildlife Refuge
26
26
24
Adams County
Franklin County
24
Grant Co.
Franklin Co.
Grant Co.
Benton Co.
Grant County
Washington
Potholes Reservoir Resource Mangement Plan
Environmental Impact Statement
Location Map

POTHOLES RESERVOIR
RESOURCE MANAGEMENT PLAN
FINAL ENVIRONMENTAL IMPACT STATEMENT
SUMMARY

PURPOSE AND NEED

The purpose of developing a Resource Management Plan (RMP) for Potholes Reservoir is to balance resource protection and conservation objectives with the rising demand for increased recreation opportunities, visitor facilities, and support services.

The RMP will be used to direct land- and water-based activities at the reservoir over the next 10 years in a way that meets both public use and resource management needs and objectives. Any RMP ultimately adopted by the Bureau of Reclamation (Reclamation) will address the resource issues, concerns, goals and objectives identified by the public, and provide the critical guidance needed for the State of Washington to more efficiently and effectively manage the unique and diverse resources found within the 36,200-acre RMP study area.

PUBLIC INVOLVEMENT AND ISSUES FROM SCOPING

Chapter 5 of this Environmental Impact Statement (EIS) outlines the public involvement and agency consultation process used by the study team to gather public, agency and stakeholder input for the RMP. Throughout the RMP study process, the Reclamation routinely solicited input from the public, agencies, Native Americans, and others with a direct interest in the future management of Potholes Reservoir. Information was diligently gathered through public workshops, interviews with key opinion leaders, and ongoing consultations with local, state and federal agency personnel. Scoping was initiated in August 1996 with interviews with local chambers of commerce, environmental organizations, local business owners, and sportsman clubs. Initial public scoping meetings were held in Othello and Bellevue, Washington, in September 1996.

Through this early and open scoping process, a wide diversity of RMP issues and concerns were identified. These issues and concerns were summarized in a "Problem Statement" and used to develop the range of RMP alternatives evaluated in this EIS. To help guide the development of alternatives, a set of RMP goals and objectives (see Appendix A) were developed in consultation with the Land Management Agency and Ad Hoc Agency work groups.

The issues and concerns affecting Reclamation lands and waters at Potholes Reservoir are outlined in detail in Chapter 1 and Chapter 2. Major concerns are summarized below.

Vegetation

Issue/Concern: Vegetation at Potholes is seen as wildlife habitat to be protected and enhanced, as part of the natural landscape to be protected or restored, and as special status plant habitat and species to be protected. Noxious weeds and invasive plants continue to spread, resulting in adverse changes to wildlife habitat and plant community composition and structure.

Wildlife

Issue/Concern: The public concerns related to wildlife have been primarily general prevention of damage to wildlife and habitat. The effect of fish-eating birds on fish populations is of particular concern. Priority wildlife species and habitat issues were brought forward by the management agencies.

Fish

Issue/Concern: Reservoir fisheries have exhibited a large decline in the last 10-15 years. Fishing pressure, water temperature and quality, predation, exotic species, reservoir fluctuations, and loss of spawning habitat have been identified as affecting the viability of these populations. The concern primarily relates to panfish although many bass anglers expressed concern about the quality of the bass fishery. Many individuals were concerned with the effects of walleye and fish-eating birds as predators.

Cultural

Issue/Concern: Understand and protect the cultural aspects of the Potholes area including Traditional Cultural Properties, and sites of historic and archaeological significance.

Recreation

Issue/Concern: Recreation and related activities were the issue of most concern. The primary concerns identified were adequate facility capacity on major holiday weekends; lack of certain desired facilities and features; the types, amounts and areas where certain recreational activities are allowed; seasons and timing of recreational activities; access problems; and conflicts between recreation and natural resource objectives.

Social and Economic Resources

Issue/Concern: Changes in the type and amount of recreational use, public access, outputs, and commodities could have an effect on local social acceptability of the actions.

Additional issues and concerns were identified during scoping. All of them were addressed to some level in the RMP alternatives and specific plan elements/actions featured. Chapter 2 outlines the specific plan elements and features included in each of the alternatives being considered by the Reclamation.

ALTERNATIVES

As required under the National Environmental Policy Act, this EIS evaluates the impacts of the No Action Alternative. It also evaluates impacts of the actions contained in three RMP "action" alternatives being considered by Reclamation, one of which has been identified as the Preferred Alternative.

Alternative A - No Action: This alternative includes the actions and developments likely to occur in the absence of adopting and implementing a RMP for Potholes Reservoir. Many of the actions and developments identified are either required under existing Reclamation or federal law, policy, or regulation; are needed to meet applicable state or local regulations; or are authorized by existing management plans and agency policies in effect at Potholes Reservoir. This alternative therefore represents the current and foreseeable management situation at Potholes Reservoir.

Similar to the three "action" alternatives described below (Alternatives B, C, and D), the Washington State Parks and Recreation Commission (SPRC) and Washington Department of Fish and Wildlife (WDFW) will continue to administer and manage the Potholes Reservoir area with oversight provided by the Ephrata Field Office of the Bureau of Reclamation. The Grant

County Sheriff's Office will also remain a management partner at the reservoir providing general law enforcement services and periodic patrols within the Grant County Off Road Vehicle (ORV) Park.

Specific to the issue of ORV management within the RMP study area, no changes would be made. Under the No Action Alternative, the "Red Zone" would remain closed to motorized travel/ORV use year-round, the "Yellow Zone" would remain open to motorized travel/ORV use from July 1 to October 1, and the "Green Zone" would remain open to motor vehicle travel/ORV use year-round (see Figure 2-2).

Under the "No Action" alternative, existing roads, trails, and recreation facilities would be maintained to support current levels of activity, with limited improvements made only on an as-needed basis and as funding permits. Required improvements for safety, sanitation, and accessibility for persons with disabilities would also be undertaken as funding allows. Overall, future land use and resource management decisions would continue on an ad hoc basis in the absence of a cohesive and comprehensive RMP to guide agency decisions and activities over the 10-20 year planning period.

Alternative B - Preferred Alternative: This alternative reflects Reclamation's preferred alternative for Potholes Reservoir. It balances the management agencies' and public's long-term vision for Potholes Reservoir and recognizes the need to protect the natural and cultural environment while supporting the overall recreational interests of visitors. By combining certain plan elements and features from Alternatives C and D, the Preferred Alternative was identified as the alternative that best satisfies the RMP goals and objectives.

A mix of developed recreation areas and "designated" dispersed camping areas would be provided to accommodate the demand for recreation facilities and sites, and to direct use to specific areas environmentally suited for public use. Specific to the issue of ORV management within the study area, further ORV use restrictions are proposed to improve wildlife habitat, wildlife populations, sand dune integrity, and vegetative cover. This would be accomplished by permanently closing a portion of the existing "Yellow Zone" to motor vehicle travel and ORV use, and keeping the remaining portion open seasonally from July 1 to October 1 (see Figure 2-4.1).

Alternative C - Preservation/Enhancement: With an emphasis on natural resource preservation and enhancement, the number of developed recreation areas and facilities would remain essentially unchanged as no new developments would be constructed except to meet minimum basic facility needs for sanitation, public safety, and accessibility for persons with disabilities. With more of the secondary road network closed to motorized travel, fewer

dispersed recreation areas would remain accessible by motor vehicle compared to the other alternatives. Similar to the other "action" alternatives, land use activities would be focused and managed within environmentally suitable areas to reduce resource impacts and disturbances.

Specific to the issue of ORV management, ORV riding within the RMP study area would be discontinued by permanently closing the "Yellow Zone" (located in the Lower Crab Creek Arm Management Area) and a portion of the "Green Zone" (located in the Eastern Dunes Management Area) to motor vehicle travel/ORV use (see Figure 2-6.1).

Alternative D - Recreation Development: With an emphasis on recreation development, this alternative includes the highest number of developed and primitive recreation facilities and sites. Consistent with this management emphasis, ORV riding opportunities would be expanded by opening a portion of the existing "Red Zone" to motor vehicle travel/ORV use. Other land use activities would generally be focused and managed within environmentally suitable areas to reduce resource impacts and disturbances (see Figure 2-7.1).

SUMMARY OF EFFECTS

Vegetation

Net positive impacts on vegetation are expected under each of the RMP alternatives. The greatest vegetation benefits would be realized under Alternative C, followed by Alternatives B and D, respectively. Alternatives B is expected to have a greater net beneficial effect than D due to a higher level of control, over uncontrolled dispersed camping, a higher level of habitat protection due to Habitat Management Area (HMA) designation, and the closure of a portion of the Yellow Zone to ORV use. Alternative C would have the greatest level of protection from the level of habitat protection.

Wildlife

Effects to wildlife species and habitat are directly related to vegetation loss or gain. No effect to special status species and Threatened and Endangered Species (TES) are expected from this action with the application of site specific mitigation. General species are affected by habitat lost and would be relative to impacts to vegetation. Net positive effects on wildlife are expected under each of the RMP alternatives based on the amount of habitat managed for vegetation restoration . The greatest benefit would be realized under Alternative C, followed by Alternatives B, D and A.

Fish

Alternative A would result in the least benefit to fish or aquatic resources. The negative impacts to fish populations associated with continued vegetation loss, sediment delivery to the reservoir, and dispersed camping are described under the individual alternatives.

No impacts to fish or aquatic resources are expected with Alternatives B, C, or D. A net positive impact due to the development of HMAs is expected regardless of the RMP alternative selected. Overall, Alternative C would have the greatest positive impact due to improved riparian and shoreline conditions, and reduced use of sensitive habitat areas.

Cultural

All alternatives are designed to protect significant cultural resources. The ability to protect unknown or undiscovered sites is greatest in those alternatives in which ground disturbance is the least. Under No Action, dispersed camping would not be directed to specific sites designated and managed for "dispersed", "boat in", or "primitive" camping. Instead, this activity would continue to be allowed throughout the reservoir area (excluding the State Parks Management Zone). The action alternatives would allow these activities in varying degrees. Alternative C would allow for the least restrictive while Alternative D would be the most. Alternative B would have a moderate restriction on these types of activities.

Recreation

The availability, timing, ease or mode of access, and economic setting of recreation activities vary by alternative. Alternative D emphasizes recreation development and provides the highest number of developed recreation sites. Additional ORV access would be developed. Recreation would be focused and managed within environmentally suitable areas to reduce impacts and disturbances to sensitive habitat areas. Alternative B provides slightly fewer developed and dispersed recreation opportunities. ORV use restrictions could impact users accustomed to riding in the study area.

Under Alternatives A and C, the number of developed recreation opportunities would remain essentially unchanged, with some provisions for public safety and universal access. Alternative C closes more primitive and secondary roads to motorized vehicles than the other alternatives, and restricts public access in more management areas.

Social Economic Resources

Based on user surveys (see Recreation 3.13) a qualitative assessment of how recreational users would accept changes in the management of Potholes Reservoir has been displayed. It is necessary to understand that these values are reflective of the people who recreate in the Potholes area and only give some indication of the people who live within Grant County. We must understand that the social and economic bases for the Grant County area are agriculture and not recreation. Some individuals and user associated groups would tend to benefit from changes in the use and type of recreation that is available. Those individuals and groups have been considered within this analysis.

This analysis assessed the value that individual or groups place on the existing condition and what is acceptable for change. Using the effects indicators, specific management actions, and user surveys we can establish the acceptability for change of management actions and compare that acceptability to the degree of physical recreational changes and improvements.

The economic portion of the impact assessment describes personal income growth from the broad scale and recreational expenses and income for the project area only. Some individuals and groups may benefit economically from recreational and general improvements in the Potholes area. However, overall personal income growth, changes in unemployment, increase in jobs would only be affected slightly within the Grant County area. Populations are expected to increase and agricultural based economics are expected to flourish and fluctuate with the amount of available water.

Below is a table comparing the direct and indirect effects of the actions by alternative. Low, Moderate, and High indicate comparison between alternatives, NC is no change:

SUMMARY OF IMPACTS

Table S-1
Summary of Effects by Alternative
Potholes Reservoir

Environmental Indicator	Environmental Effects			
	Alternative A	**Alternative B**	**Alternative C**	**Alternative D**
Vegetation (4.4)				
Acres of suitable habitat managed for: - development (State Parks) - ORV parks - roads/trails - agriculture - grazing Acres of designated Habitat Management Areas	 11 3,354 2.5 52 7,400 0	 91 2,435 3.3 52 7,400 3,950	 11 1,227 -18.2 (less) 52 0 7,166	 91 3,354 13.9 52 7,400 1,964
potential for reduction in noxious weed	low	moderate	high	low
Affect on Special Status Plant Species	low beneficial effect	moderate beneficial effect	high beneficial effect	low beneficial effect
Wildlife (4.5)				
Potential for adverse effects to wildlife from loss of suitable habitat and changes in recreational use	high	moderate	low	moderate-high
Special Status Wildlife Species	low beneficial effect	moderate beneficial effect	high beneficial effect	low beneficial effect
Fish (4.6)				
Overall fishery disturbance, harassment and habitat destruction	moderate - high	moderate	low	high

Alternatives: A=No Action, B=Preferred Alternative, C=Natural Resource Conservation , D=Recreation Development

Table S-1
Summary of Effects by Alternative
Potholes Reservoir

Environmental Indicator	Environmental Effects			
	Alternative A	**Alternative B**	**Alternative C**	**Alternative D**
Cultural (4.8)				
Potential disturbance factors affecting cultural site integrity (non-inventoried areas, undiscovered)	high	moderate	low	high
Indian Trust Assets	no change	no change	no change	no change
Land Use (4.12)				
Study area land base impacted by land use change (acres)	139	5,827	15,003	2,744
Recreation (4.13)				
Acres of dispersed camping - open year round/seasonal - closed except designated	 14,753 3,831	 12,595 6,529	 6,164 12,420	 13,948 4,636
Acres of increased developed recreation opportunities/capacity to accommodate public demand	11	91	11	91
Fishing access	no change	improved	less than existing	greatly improved
Acres of off-road vehicle (ORV) riding opportunities available	3,354	2,435	1,227	3,354
Social Economic Resources (4.14)				
Degree of Acceptability	moderate	moderate	low	moderate-high

Alternatives: A=No Action, B=Preferred Alternative, C=Natural Resource Conservation , D=Recreation Development

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ACRONYMS AND ABBREVIATIONS

A	Agriculture, zoning designation
AAQS	Ambient air quality standards
the Advisory Council	Advisory Council on Historic Preservation
ASTs	Aboveground storage tanks
AUM	Animal-unit-month
BA	Biological Assessment
BLM	Bureau of Land Management
BMPs	Best Management Practices
BTI	Bacillus thuringiensis
CBIP	Columbia Basin Irrigation Project
CBP	Columbia Basin Project
CBWA	Columbia Basin Wildlife Area
CNWR	Columbia National Wildlife Refuge
CRMP	Cultural Resource Management Plan
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
F	Fahrenheit
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
FWCA	Fish and Wildlife Coordination Act
GMA	Growth Management Act
GMU	Game Management Unit
GWMA	Ground Water Management Area
HEP	Habitat Evaluation Procedures
HMAs	Habitat Management Areas
HSI	Habitat Suitability Index
IAC	Interagency Committee for Outdoor Recreation
ITAs	Indian Trust Assets
LAC	Limits of Acceptable Change
LMA	Land Management Agency
LUSTs	leaking underground storage tanks
MCLs	Maximum Contaminant Levels
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NAGPRA	Native American Graves Protection and Repatriation Act
NCDC	National Climate Data Center

NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources and Conservation Service
NTMBs	Neotropical migratory birds
NTU	Nephalometer turbidity unit
ORV	Off road vehicle
ORVAC	Off-Road Vehicle Advisory Committee
ORW	Outstanding Resource Waters
OS-R	Open Space-Recreation, zoning designation
PCB	Non-Polychlorinated Biphenyl
P-D	Planned Unit Development, zoning designation
PEC	Potholes East Canal
ppm	Parts per million
PSD	Prevention of Significant Deterioration
PUD	Public Utility District
PWC	Personal watercraft
Reclamation	Bureau of Reclamation
RMP	Resource Management Plan
ROS	Recreation Opportunity Spectrum
RVs	Recreational vehicles
SACs	Special Areas of Concern
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SCS	Soil Conservation Service
SEPA	State Environmental Policy Act
SHPO	State Historic Preservation Office
SI	Suitability index
SIP	State Implementation Plan
SPRC	State Parks and Recreation Commission
STMA	Scattered Tracts Management Area
TDS	Total dissolved solids
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	U.S. Geological Survey
USTs	Underground storage tanks
VRM	Visual Resource Management
WAC	Washington's Administrative Code

WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WDOE	Washington Department of Ecology
WDOH	Washington Department of Health
WDOT	Washington Department of Transportation
WDPR	Washington State Department of Parks and Recreation
WIGWC	Washington State Interagency Ground Water Committee
WNHP	Washington Natural Heritage Program
WSPRC	Washington State Parks and Recreation Commission
YIN	Yakama Indian Nation

CHAPTER 1
PURPOSE AND NEED

1.1 INTRODUCTION

To provide management guidance for the land and water resources under Bureau of Reclamation (Reclamation) jurisdiction at Potholes Reservoir, the development and implementation of a Resource Management Plan (RMP) is proposed. Located about 4 miles south and southeast of Moses Lake in southern Grant County, Washington, the 36,200-acre Potholes Reservoir RMP study area defines the Reclamation lands and waters which are the subject of this Final Environmental Impact Statement (FEIS). As required under the National Environmental Policy Act (NEPA), this FEIS evaluates the impacts of the No Action Alternative. It also evaluates impacts of the actions contained in the three RMP "action" alternatives being considered by the Reclamation, one of which has been identified as the Preferred Alternative.

Created by O'Sullivan Dam, a 4-mile-long earth fill dam that is one of the largest of its kind in the United States, Potholes Reservoir lies immediately downstream of Moses Lake in the Lower Crab Creek Basin (Location Map). Built as part of the Columbia Basin Project (CBP), the reservoir's main water supply is operational waste and irrigation return flow from northern CBP lands irrigated from the East Low and West Canals. Reservoir inflows originate from Moses Lake through the Crab Creek channel on the north side, from the Lind Coulee Wasteway on the east side, and from the Winchester and Frenchman Hills Wasteways on the west side. Irrigation water for the southern part of the CBP is distributed via the Potholes Canal which begins at O'Sullivan Dam.

The Columbia National Wildlife Refuge (CNWR) is located immediately south of the dam and the Desert Habitat Management Unit is immediately west of the reservoir. A series of "seep" lakes just south of O'Sullivan Dam are maintained through underground drainage from the reservoir. State Highway 262 traverses the top of the dam and is the main access route leading to many of the popular recreational opportunities found at the reservoir and CNWR.

The creation of Potholes Reservoir in 1950 resulted in a unique water-based ecosystem within an arid high desert environment. Over the last 50 years, the presence of water coupled with natural plant succession and changes in land and recreational use have created and modified the variety of plant communities and habitats found at the reservoir. These ever-changing influences on the landscape are affecting the ability of the study area to sustain traditional wildlife and fisheries species while accommodating increased public use and recreational demands.

With increased use from the recreating public, the quality of the natural resources found at Potholes Reservoir is projected to decline as well as accelerate conflicts between future recreation and natural resource protection needs. This trend is expected to continue unless future

resource and recreation management decisions are made through a coordinated and integrated RMP tailored to existing resource conditions and needs. The Reclamation initiated the Potholes Reservoir RMP study and scoping process in August 1996.

The range of alternatives considered and evaluated in this FEIS are based on the four alternatives originally developed by the Reclamation study team and evaluated in a preliminary environmental assessment prepared in 1998. Although never published and distributed to the public, this preliminary assessment identified a potential for significant impacts on the natural and human environment. Consequently, the Reclamation issued a Notice of Intent (NOI) to prepare an FEIS on September 1, 1998, for the Potholes Reservoir RMP. The purpose of this FEIS is to provide a full and fair disclosure of the environmental impacts anticipated under each of the four alternatives being considered, and to inform decision-makers and the public of these impacts so that future RMP decisions and actions can be determined.

1.2 PURPOSE AND NEED

Since 1952, the land and water resources found at Potholes Reservoir have been managed under a Memorandum of Agreement (MOA) between the United States, acting through the Reclamation, and the State of Washington. Under the MOA, the state - acting through the Washington State Parks and Recreation Commission (WSPRC) and the Washington Department of Fish and Wildlife (WDFW) - agreed to be partners in the administration of the lands and waters at Potholes Reservoir for public recreation, fish and wildlife habitat, and related responsibilities. The existing MOA expires in 2002. Under Reclamation policy, any new management agreement will require the state to follow an approved RMP.

Recreation is the predominant activity affecting Reclamation lands and waters at Potholes Reservoir. Dispersed use in undeveloped areas, combined with a general lack of recreation facilities and services to accommodate this use, is central to most of the resource management issues and needs which affect the study area. Direct and indirect, individual and cumulative impacts to soils, water quality, vegetation, wildlife and cultural resources are all linked to the range of recreation activities that occur within the study area. The purpose of a RMP for Potholes Reservoir will be to balance resource protection and conservation objectives with the rising demand for increased recreation opportunities, visitor facilities, and support services.

The RMP will be used to direct land- and water-based activities at the reservoir over the next 10 years in a way that meets both public use and resource management needs and objectives. Any RMP ultimately adopted by the Reclamation will address the resource issues, concerns, goals and objectives identified by the public. The State of Washington's management agreement with the

Bureau of Reclamation is longer then the anticipated life of the RMP and would need to be revised when the RMP is revised.

The new management agreement between the Reclamation and the state for Potholes Reservoir is expected to last for a period of twenty years. The agreement will require the state to follow and comply with the requirements, actions and guidelines contained in the Potholes Reservoir RMP. The RMP will provide for the coordinated use of resources, protection of natural and cultural resources, public access, public health and safety, and acceptable public use, including reasonable and adequate recreation facilities to accommodate land and water-based activities. The RMP will be updated and revised as deemed appropriate by the Reclamation on behalf of the United States.

1.3 PUBLIC INVOLVEMENT AND ISSUES FROM SCOPING

Chapter 5 of this FEIS outlines the public involvement and agency consultation process used by the study team to gather public, agency and stakeholder input for the RMP. Throughout the RMP study process, the Reclamation routinely solicited input from the public, agencies, Native Americans, and others with a direct interest in the future management of Potholes Reservoir. Information was diligently gathered through public workshops, interviews with key opinion leaders, and ongoing consultations with local, state and federal agency personnel. Scoping was initiated in August 1996 with interviews with local chambers of commerce, environmental organizations, local business owners, and sportsman clubs. Initial public scoping meetings were held in Othello and Bellevue, Washington, in September 1996.

Through this early and open scoping process, a wide diversity of RMP issues and concerns were identified. To help guide the development of alternatives, a set of RMP goals and objectives (see Appendix A) were developed in consultation with the Land Management Agency and Ad Hoc Agency work groups (see Sections 5.5 and 5.6).

The RMP goals and objectives were distributed to interested Tribes, agencies and the public for review and comment. These parties were also solicited for their input on potential management actions for the RMP. The initial array of alternatives developed from this process were further scrutinized by the Tribes, agencies, work group members, and the public and lead to the range of alternatives brought forward for detailed analysis.

The issues and concerns affecting Reclamation lands and waters at Potholes Reservoir are summarized below beginning with the physical, followed by the biological, and the social environment. Each issue or concern is framed in the context of a problem statement and

followed by a general description of the management actions being considered to address the issue/concern. The impact indicators identified will be used to track the environmental impacts studied and described in Chapter 4, "Environmental Consequences."

Air Quality

Issue/Concern: The effects of development and maintenance operations on the quality of air within the Potholes project area.

Management Actions: Mitigation measures would be applied to maintain air quality standards and decrease the short-term impacts of construction and maintenance.

Indicators:

- Compliance with criteria for the National Ambient Air Quality Standards
- Effect of recreational and management activities changes on emission standards

Soils

Soils in the RMP area consist of two broad soil groups (see Section 3.2, Soils). Soil type and productivity are the bases for identifying prime wildlife habitat and recreation development opportunities and constraints. Soil erosion, disturbance, and compaction are elements that affect long-term productivity of the soil resource and its associated habitat value.

Issue/Concern: Maintain shoreline stability and reduce upland soil losses and disturbances.

Management Actions: Conduct an integrated erosion control program, implement shoreline erosion control measures, limit or eliminate activities on unsuitable soils, and monitor erosion control projects.

Indicators:

- Change in soil productivity
- Change in soil erosion, disturbance, and compaction

Water Quality

Ground and surface water quality is a complex subject at Potholes Reservoir given its operational characteristics as an irrigation project and its primary source of supply (e.g., irrigation return flow). Water quality issues were generally expressed in relation to the effect on reservoir fisheries. Potential human health effects were linked to human waste and pesticide contamination. Some individuals were concerned with the safety of eating fish from the reservoir.

Issue/Concern: The effects of the addition of human waste, increased turbidity/sedimentation, water level fluctuation, and pesticide residues on the quality of ground and surface water.

Management Actions: Expand the reservoir water quality and sediment sampling program. Review the need for routine testing of fish flesh for concentrations of contaminates for pesticides and heavy metals, and minimize chemical mosquito control methods.

Indicators:

Change in pesticide and human waste contaminant levels
Change in reservoir turbidity and sedimentation
Attainment of water quality standards and beneficial use designations

Vegetation

The study area is characterized by shrub-steppe, wetland and riparian plant communities in a unique "pothole" and sand dune environment. Wetland and riparian communities are influenced by a dynamic land and water interface due to reservoir fluctuations and drawdown patterns. Over time, this environment has created or influenced riparian forest; riparian shrub; dense and very dense shrublands; emergent wetlands; and other various upland habitat types.

Issue/Concern: Vegetation at Potholes is seen as wildlife habitat to be protected and enhanced, as part of the natural landscape to be protected or restored, and as special status plant habitat and species to be protected. Noxious weeds and invasive plants continue to spread, resulting in adverse changes to wildlife habitat and plant community composition and structure.

Management Actions: Rehabilitate areas severely damaged by land use activities, mechanically remove salt cedar trees, implement a noxious weed control plan, and conduct special status plant surveys prior to ground disturbing activities.

Indicators:

Change in plant community abundance and composition
Change in noxious weed proliferation

Wildlife

The range of habitats created by Potholes Reservoir provide a unique and diverse assemblage of wildlife species including neotropical migratory birds and bald eagles. The extensive wetland and riparian habitats found at the reservoir are particularly important in a landscape dominated by adjacent shrub-steppe and irrigated agriculture.

Issue/Concern: The public concerns related to wildlife have been primarily general prevention of damage to wildlife and habitat. The effect of fish-eating birds on fish populations is of particular concern. Priority wildlife species and habitat issues were brought forward by the management agencies.

Management Actions: Designate and manage Habitat Management Areas (HMAs) where the protection and enhancement of existing quality habitat assemblages is critical to wildlife population and species integrity. Restore/rehabilitate areas presently degraded by land use activities using plants native to the area and beneficial to wildlife and special status species. Seasonally restrict public access in the south/central portion of North Potholes Reserve.

Indicators:

Change in habitat quantity
Change in habitat quality
Effect on federal and/or state listed threatened, endangered or other special status wildlife species

Fish

The fisheries resource and the quality of the fishing experience were the most frequent area of concern identified by the public. Fishing is an important economic and recreation resource locally and regionally. The reservoir historically provided quality habitat for the production of spiny ray panfish such as perch, crappie, and bluegill.

Issue/Concern: Reservoir fisheries have exhibited a large decline in the last 10-15 years. Fishing pressure, water temperature and quality, predation, exotic species, reservoir fluctuations, and loss of spawning habitat have been identified as affecting the viability of these populations. The concern primary relates to panfish although many bass anglers expressed concern about the quality of the bass fishery. Many individuals were concerned with the effects of walleye and fish-eating birds as predators.

Management Actions: Manage diked "carp free" waters as a separate fishery from the main reservoir. Target warm water species such as bass and bluegill. Prohibit the use of pesticides and herbicides harmful to fish unless authorized by WDFW and Reclamation for habitat enhancement.

Indicators:

Fish spawning and population viability
Changes in reservoir turbidity and sedimentation

Threatened and Endangered Species (TES)

Construction development and area expansion could have an effect on habitats and species that are already at risk in the Potholes area and are protected under ESA.

Issue/Concern: The effects of the RMP Alternatives on TES species.

Management Actions: Inventory of these species and protect or avoid any known populations.

Indicators:

Effects to endangered, threatened, and proposed species

Cultural

Numerous laws, regulations and policies at the state and federal level seek to protect and manage cultural resources each of which may have historical, architectural, archaeological, cultural, traditional, sacred, and/or scientific importance.

Issue/Concern: Cultural resources within the Potholes Reservoir area could be lost with new ground disturbing activities.

Management Actions: Complete Class III cultural surveys and consult with the State Historic Preservation Officer. Complete the Cultural Resource Management Plan (CRMP).

Indicators:

Effects on Register-eligible cultural resource properties

Indian Trust Assets

Issue/Concern: Understand and protect the cultural aspects of the Potholes area including Indian Trust Assets.

Management Actions: Coordinate and work with Native Americans to develop and display appropriate information on Native American use of the area and the need to preserve and protect cultural resources and traditional values.

Indicators:

Effects on Indian Trust Assets

Visual Quality

Issues/Concerns: Maintenance or improvement of existing landscape character and scenic attractiveness within each management unit of the RMP study area.

Indicators:

Deviation from existing landscape character, including visible habitat degradation such as erosion and loss of vegetative cover; evidence of dumping, trash and human waste

Rehabilitation or restoration of previously disturbed areas to maintain or improve scenic quality

Additional viewing opportunities

Noise

Issue/Concern: Effect of the RMP alternatives increases or decreases in noise in the project area.

Indicators:

Effects of actions on increases in noise

Land Use

Issues/Concerns: Appropriate management of land use change within the study area

Indicators:

Acreage of land use change

Recreation

Various land- and water-based recreational opportunities are available within the study area. Fishing, camping, boating, off-road vehicle (ORV) riding, and wildlife observation are some of the most popular activities. Problems associated with high public use range from inadequate sanitation facilities, littering and trash dumping, habitat degradation, overcrowding, public hunting opportunities, and motorized water craft conflicts.

Issue/Concern: Recreation and related activities were the issue of most concern. The primary concerns identified were adequate facility capacity on major holiday weekends; lack of certain desired facilities and features; the types, amounts and areas where certain recreational activities are allowed; seasons and timing of recreational activities; access problems; and conflicts between recreation and natural resource objectives.

Management Actions: All of the alternatives address these issues/concerns in varying degrees. Recreation was a key issue in the development of the Potholes Reservoir RMP. See Chapter 2, "Alternatives" for details on the specific management actions being considered to balance recreation opportunities and facility needs with resource protection objectives.

Indicators:

Changes in ORV riding opportunities
Presence of sanitation facilities in high use areas
Change in public access opportunities
Change in dispersed camping opportunities
Change in number and type of recreation facility amenities

Management and Infrastructure

Inherent in the management of Potholes Reservoir is the clear definition of agency management responsibilities and jurisdictional authorities. This issue was resolved by the establishment of management goals and objectives through interagency collaboration.

Issue/Concern: Both the public and management agencies are concerned about the lack of adequate resources to provide public services and law enforcement. Many individuals stressed the presence of garbage, litter, and human waste as an indicator of infrastructure problems. Others voiced enforcement concerns related to public safety and environmental protection.

Management Actions: The alternatives outlined in Chapter 2 meet this concem to varying degrees. Collaborative efforts and a merging of resources by all agencies, recreation groups, and the public will be necessary to meet this concern. The reason for the RMP is to meet these needs and concerns. This is the objective of the RMP. This issue is imbedded in each alternative to differing degrees and will not be analyzed as an issue in this assessment.

Social and Economic Resources

Issue/Concern: Changes in the type and amount of recreational use, public access, outputs, and commodities could have an effect on local social acceptability of the actions.

Management Actions: One of the primary recreation-related objectives of the RMP is to retain the current diversity of recreational opportunities to meet public needs and desires at Potholes Reservoir.

Indicators:

Individual and group acceptability of change
Changes in recreational use and recreation-related income and expenditures
Changes in personal income growth

Additional issues and concerns were identified during scoping. All of them were addressed to some level in the RMP alternatives and specific plan elements/actions featured. Chapter 2 outlines the specific plan elements and features included in each of the alternatives being considered by the Reclamation.

1.4 OTHER RELATED ACTIONS AND ACTIVITIES

The Reclamation and the State of Washington (WDFW and SPRC) are currently involved in several related projects and activities which could affect future resource conditions and management decisions at Potholes Reservoir. Similarly, other agencies are also involved in a range of activities that may have a bearing on Potholes Reservoir resource conditions and management. The following actions have the potential to cause cumulative impacts in the study area.

Grant County Comprehensive Plan - The Grant County Comprehensive Plan was adopted in September, 1999 pursuant to the Washington State Growth Management Act (RCW 36.70A). The updated Plan addresses land use, critical areas and resource lands, housing, transportation, capital facilities, and utilities within county boundaries. Specific to the "Open Space and Recreation" designation which encompasses the RMP study area, the Growth Management Act (GMA) goal for these lands encourages the retention of open space, the development of recreational opportunities, the conservation of fish and wildlife habitat, and access to natural resource lands and water. This GMA goal and the associated policies outlined in the Plan were

considered in development of alternatives. Similarly, the management actions under consideration could indirectly affect areas under county jurisdiction and authority.

Columbia Basin Wildlife Area Management Plan - As part of the WDFW's public holdings, the Columbia Basin Wildlife Area (CBWA) incorporates many scattered tracts of land developed as a result of Reclamation's Columbia Basin Project. In 1997, the plan was drafted to provide guidance for the management of these tracts. While Potholes Reservoir is one of the sixteen management unitswithin the CBWA, no specific wildlife management proposals or activities were developed for the unit.

Grant County Shorelines Management Master Program - Potholes Reservoir is listed as a shoreline of statewide significance in the Grant County Shorelines Management Master Program (WAS 173-20-290). To the extent practicable, shorelines under Reclamation jurisdiction are managed in accordance with Grant County guidelines. Each of the RMP alternatives adhere to the objectives established for each of the Master Program environments identified at Potholes Reservoir.

Ground Water Management Area (GWMA) - In 1998, under recommendation of the Washington State Interagency Ground Water Committee (WIGWC), a GWMA was established that encompasses Grant, Adams, and Franklin counties. The state, in cooperation with the county health districts, monitors nitrate levels throughout the GWMA to identify areas of particular concern for implementing additional agricultural "Best Management Practices."

1.5 SPECIFIC PERMITS REQUIRED

U.S. Environmental Protection Agency or Washington State Department of Ecology: water quality certification under Section 401 of the Clean Water Act for shoreline or water related construction activities, Section 404 of the Clean Water Act for wetland fill, and any companion state permits deemed necessary.

U.S. Environmental Protection Agency or Washington State Department of Ecology: National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges from Construction Activities (if O'Sullivan site construction area is larger than 5 acres).

1.6 SCOPE OF THE RMP AND DOCUMENT ORGANIZATION

The scope of the RMP are the Reclamation lands and waters analysis for direct and indirect, individual and cumulative impacts within the 36,200-acre RMP study area boundary. These lands are currently administered by the State of Washington under a MOA with the United States that expires in 2002. The scope of the analysis is resource dependent. For example, impacts to wildlife might need a larger scope of analysis due to indirect impacts related to movement or displacement, than that for vegetation or soils. These are discussed in Chapter 4 relative to each resource.

This document consists of the following main chapters:

Chapter 1 - Purpose and Need: Generally describes the purpose and need for action, public involvement/issues and concerns, and regulatory requirements.

Chapter 2 - Alternatives: Includes descriptions of the various alternatives considered in detail, those considered but eliminated for detailed study, a comparative summary of the environmental consequences, and a summary of management requirements, mitigation, and monitoring. This chapter also includes the identification of the preferred alternative.

Chapter 3 - Affected Environment: Describes existing resource conditions within the 32,000-acre RMP study area.

Chapter 4 - Environmental Consequences: Describes the direct, indirect, individual and cumulative impacts of the various alternatives on environmental resources and indicators.

Chapter 5 - Public Involvement and Agency Consultation: Describes the public involvement and agency consultation program used to obtain public and agency input throughout the RMP/FEIS study process. This chapter also contains a list of persons to whom this FEIS was distributed for review and comment.

Chapter 6 - List of Preparers

Chapter 7 - References

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Appendices (A through J)

CHAPTER 2
ALTERNATIVES

2.1 INTRODUCTION

The Resource Management Plan (RMP) alternatives evaluated in this Final Environmental Impact Statement (FEIS) were developed by the Bureau of Reclamation study team using the input received from the Land Management Agency and Ad Hoc work groups, state and federal agency representatives, and the public. Based upon the issues identified through the public involvement and scoping process (see Chapter 1), the work groups helped the Reclamation develop a set of RMP goals and objectives (see Appendix A) for Potholes Reservoir. These goals and objectives provided the underlying framework used by the study team to develop the range of alternatives detailed in this chapter. The Preferred Alternative was selected by Reclamation based on the analysis in the Environmental Assessment and recommendation from the LMA Group and Ad-Hoc Group. On January 26, 2001, the Potholes Draft Environmental Impact Statement (Potholes DEIS) was released for public review. Due to the public's heavy response pertaining to proposed closure of existing portions of the Off Road Vehicle (ORV) Area, the comment period was extended to April 28, 2001. During this time a public hearing and several Ad Hoc and concerned group meetings were held. In April, two public protests and one support rally regarding the closure of the Yellow Zone occurred at the Bureau of Reclamation (Reclamation) office in Ephrata, Washington.

Reclamation conducted a Potholes DEIS public hearing on March 13, 2001, at the Midway Learning Center in Moses Lake, Washington, to hear and record the public's comments. The hearing consisted of two sessions (from 3:00 p.m. to 5:00 p.m. and from 7:00 p.m. to 9:00 p.m.). Approximately 150 people attended the sessions. Of those, 29 individuals made statements for the public record. Most comments reflected concern about the proposed limitations of ORV use in the Yellow Zone.

Reclamation conducted an agency meeting, on May 7, 2001, attended by representatives of the U.S. Fish and Wildlife Service (FWS), the Washington Department of Fish and Wildlife (WDFW), and the Grant County Sheriffs Office. The purpose of the meeting was for the administering agencies to consider modifying proposed acreage reduction of the ORV Yellow Zone, based on the comments received at the public hearing. Individuals from Grant County discussed personnel limitations and budget constraints of the agencies to adequately manage present jurisdictions. WDFW and Reclamation expressed the need to balance habitat preservation with public demand for recreation use within the study area. After the suggestion of various management options, Reclamation informed the group they would present the findings to Reclamation's regional manager.

The participating agencies met again, on June 4, 2001, to discuss a modified Preferred Alternative for the ORV Yellow Zone. Agreement from the user groups, agencies, and jurisdictional entities modified the Preferred Alternative to say, "Close 919 acres of the 1,459 acre Lower Crab Creek Arm Management Area (Yellow Zone) to motor vehicle travel and ORV use year-round. Maintain as seasonally open (July 1 to October 1) 540 acres of the 1,459 acre Yellow Zone."

Each alternative identifies specific actions to be taken within each management area as well as actions that are applicable reservoir-wide. The range of alternatives considered and described in this chapter includes the four alternatives initially developed by the study team and modified to incorporate additional public and agency comments, issues, and resource constraints. To help the reader understand and compare each of the alternatives evaluated in this FEIS, Tables 2-1 through 2-3 summarize the alternatives in matrix form in Section 2.4.

During RMP/FEIS scoping, the public clearly identified natural resource protection as essential in any management plan for the RMP study area. The public comments also indicated that those who use Potholes Reservoir place a high value on keeping the area semi-primitive with overnight use focused in developed recreation areas or designated dispersed use areas. Off-road vehicle use and dispersed camping were common concerns due to the adverse impacts often associated with these activities (e.g., soil erosion, habitat damage, and wildlife disturbance). Consequently, the management themes used to develop the alternatives described in this chapter address these general principles and resource concerns.

To assist in the development of environmentally sensitive alternatives, the Reclamation team conducted a land suitability and constraints analysis. The analysis involved a two-step process: (1) the development of land suitability criteria, and (2) the application of these criteria to the study area. Through this process, areas appropriate for resource protection, Habitat Management Area (HMA) designation, or general public use were identified.

It is important for the reader to note that the land and water surface acreage included in this FEIS are based on estimates derived from aerial photographs taken on April 28, 1994. These photographs represent high reservoir water elevations and consequently do not reflect the land additions that occur as reservoir elevations decline. At low reservoir elevations, the total land surface area located within the study area is significantly higher.

This chapter describes three RMP "action" alternatives as well as the alternative of "no action." This Chapter will also discuss those alternatives considered and the rational for elimination from further study. The alternatives and themes which emerged from the planning process can be characterized as follows:

Alternative A - No Action: This alternative includes the actions and developments likely to occur in the absence of adopting and implementing a RMP for Potholes Reservoir. Many of the actions and developments identified are either required under existing Reclamation or federal law, policy, or regulation; are needed to meet applicable state or local regulations; or are authorized by existing management plans and agency policies in effect at Potholes Reservoir. This alternative therefore represents the current and foreseeable management situation at Potholes Reservoir.

Similar to the three "action" alternatives described below (Alternatives B, C, and D), the Washington State Parks and Recreation Commission (SPRC) and Washington Department of Fish and Wildlife (WDFW) will continue to administer and manage the Potholes Reservoir area with oversight provided by the Ephrata Field Office of the Bureau of Reclamation. The Grant County Sheriff's Office will also remain a management partner at the reservoir providing general law enforcement services and periodic patrols within the Grant County ORV Area.

No changes would be made to motorized travel and ORV management within the RMP study area. The 433-acre "Red Zone" would remain closed to motorized travel/ORV use year-round, the 1,459- acre "Yellow Zone" would remain open to motorized travel/ORV use from July 1 to October 1, and the 1,895-acre "Green Zone" would remain open to motor vehicle travel/ORV use year-round. The Grant County ORV Area currently includes Reclamation lands both inside and outside the RMP study area as well as Grant County lands adjacent to the study area resulting in about 1,895 acres "open year-round" and 1,459 acres "open seasonally."

Existing roads, trails, and recreation facilities would be maintained to support current levels of activity, with limited improvements made only on an as-needed basis and as funding permits. Required improvements for safety, sanitation, and accessibility for persons with disabilities would also be undertaken as funding allows. Overall, future land use and resource management decisions would continue on an ad hoc basis in the absence of a cohesive and comprehensive RMP to guide agency decisions and activities over the 10 year planning period.

Alternative B - Preferred: Alternative B is the Reclamation's preferred alternative. It balances the management agencies' and public's long-term vision for Potholes Reservoir, recognizing the need to protect the natural and cultural environment while supporting the overall recreational interests of visitors. By combining elements and features from Alternatives C and D and the modifications from agency and public review, Alternative B best satisfies the RMP goals and objectives.

A mix of developed recreation areas and "designated" dispersed camping areas would be provided to accommodate the demand for recreation facilities and sites, and to direct use to specific areas environmentally suited for public use. ORV use restrictions are proposed to improve wildlife habitat, wildlife populations, sand dune integrity, and vegetative cover. This would be accomplished by permanently closing 919 acres of the 1,459 acre "Yellow Zone" within the RMP boundary to motor vehicle travel and ORV use and maintain as seasonally open (July 1 to October 1) the remaining 539 acres. The Grant County ORV Area would be limited to the existing "Green Zone" and encompass an estimated total of 2,435 acres inside and outside of the RMP area which is "open year-round" to ORV riding.

Alternative C - Preservation and Enhancement: This alternative emphasizes natural resource preservation and enhancement. The number of developed recreation areas and facilities would remain essentially unchanged as no new developments would be constructed except to meet minimum basic facility needs for sanitation, public safety, and accessibility for persons with disabilities. With more of the primitive road network closed to motorized travel, fewer dispersed recreation areas would remain accessible by motor vehicle compared to the other alternatives. Similar to the other "action" alternatives, land use activities would be focused and managed within environmentally suitable areas to reduce resource impacts and disturbances.

ORV use within the RMP study area would be discontinued by permanently closing the "Yellow Zone " (located in the Lower Crab Creek Arm Management Area) and a portion of the "Green Zone" (located in the Eastern Dunes Management Area) inside the RMP area, to motor vehicle travel and ORV use. The Grant County ORV Area would encompass about 1,227 acres and would consist of the "Green Zone" located outside the RMP study area boundary.

Alternative D - Recreation Development: With an emphasis on recreation development, this alternative includes the highest number of developed and primitive recreation facilities and sites. Consistent with this management emphasis, ORV opportunities would be expanded by allowing ORV riding along several designated trails leading to the western shore of Moses Lake. The Grant County ORV Area would encompass about 1,895 acres inside and outside the RMP area, "open year-round" and, 1,459 acres "open seasonally" within the RMP and the existing "Yellow Zone" to ORV riding. The size of the ORV park would be the same as the "No Action", greater access opportunities would be a specific element of Alternative D. Similar to the other "action" alternatives, other land use activities would generally be focused and managed within environmentally suitable areas to reduce resource impacts and disturbances.

2.2 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER STUDY

Many site-specific options and management recommendations were identified and discussed with the land management agencies (SPRC and WDFW) throughout the RMP planning effort. Nearly all of them were incorporated into the alternatives and carried forward for analysis. No other complete alternative was considered.

As the alternatives were developed and refined, a number of individual plan elements and features were dropped from further consideration. One such element would have maximized the animal-unit-month (AUM) grazing allocation in North Potholes Reserve. This action was eliminated due to problems with the present grazing regime as well as higher livestock utilization and AUM allocations in a legislatively established State Game Reserve. The reserve is used by a large variety of game and nongame wildlife year-round and is managed for waterfowl production.

Another element eliminated from detailed study involved the establishment of idle speed and no wake zones on the main reservoir for the purpose of improving boating and public safety. This element was eliminated due to recent amendments to Grant County Ordinance 6.08 - "An Ordinance Providing for the Safety of Boaters, Swimmers, and Others Using the Waters of Grant County and Providing Certain Regulations and Restrictions on the Use of Such Waters." Adopted in June 1999, the current ordinance provides that it is unlawful to operate a vessel:

- within water areas clearly marked by buoys or some other distinguishing device as a bathing or swimming area;
- at a speed in excess of minimum wake speed in any area marked with buoys or logs as a speed restricted area;
- on plane within 100 feet of other vessels, designated or marked swimming areas, any object fixed or floating, including without limitation, docks, swimming platforms; and
- on plane within 300 feet of a boat launching ramp.

It should be noted that some additional low speed and minimum wake restrictions are being considered and evaluated in this FEIS. These restrictions are designed to "seasonally" restrict watercraft speeds in selected reservoir areas (e.g., Habitat Management Areas) for the primary purpose of enhancing wildlife reproductive success.

Other plan features eliminated include:

- Install floating restrooms in the Dunes/Sand Islands management area. Several members of the public suggested that floating restrooms be considered. The Reclamation and the land management agencies eliminated this action because none of the agencies felt they had adequate resources to build and properly manage and maintain a floating restroom system on Potholes Reservoir. The need for such a system was also unsubstantiated.

- Require self-containment of sanitary waste for all boaters. Although initially considered as an alternative management strategy for the control of human wastes in the Dunes/Sand Islands management area, the land management agencies dismissed this proposal. An inability to enforce this type of action was the main reason for the dismissal.

- Develop a scenic overlook of Potholes Reservoir in the elevated area south of the reservoir. This action was eliminated because it is outside the RMP study area.

2.3 COMPARATIVE SUMMARY OF THE ALTERNATIVES

Each of the alternatives includes a set of management actions consistent with the management theme developed for that alternative. Many of the specific management actions included in the alternatives were identified by interested agencies or the public during scoping and the RMP/EIS public involvement effort. Others were developed by the study team in response to an identified issue, concern, or resource need. For each of the RMP alternatives (B, C and D), the management actions also follow the general strategies outlined in Appendix B, "General Management Strategies Associated with the RMP Alternatives."

Table 2-1 summarizes by topic the management actions included in each of the four alternatives. A dot indicates that the management action is included in the alternative and an asterisk indicates that the action varies by alternative. The following topics were used to organize and discuss the specific management actions and plan features included in each of the alternatives considered and evaluated.

- Natural Resources
- Cultural Resources
- Recreation
- Land Use and Administration

- Off-Road Vehicle Management
- Grazing Management
- Visitor Information/Interpretation
- Public Health and Safety/Environmental Protection

The alternative and concept maps (Figures 2-1 through 2-7) included in Section 2.5, "Detailed Description of the Alternatives," visually display the specific management actions and features included in each alternative. Table 2-2 and Figure 2-1 display the key management actions by management area and Table 2-3 compares by resource type the environmental consequences of each alternative as described in Chapter 4, "Environmental Consequences". These tables are included in this section.

2.4 MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES

Some management actions are included in all the alternatives because of existing law, regulatory requirements, or Reclamation policy. Others address a specific resource need or are authorized under existing management agreements or plans expected to continue regardless of the alternative selected. The following list summarizes by topic the management actions which are included in, and common to, all four of the alternatives described in this chapter and evaluated in Chapter 4.

Natural Resources:

- Conduct site-specific surveys focusing on endangered, threatened, and sensitive plants, wildlife, and their habitats prior to initiating development actions.

- Work cooperatively with the Noxious Weed Control Board of Grant County in identifying and prioritizing areas where noxious weed control is necessary.

- Emphasize weed control efforts in areas with high wildlife habitat value and potential for native species reestablishment.

- Use signs and other educational methods to enlist increased public participation in the control of noxious weeds.

- Assess the extent to which Eurasian water milfoil has become established in the reservoir and the need for and desirability of future control practices.

Table 2-1
Summary of Alternatives and Management Actions
Potholes Reservoir RMP Final Environmental Impact Statement

Management Actions	Alternatives			
	A	B	C	D
NATURAL RESOURCES				
Soil Conservation and Erosion Control				
Conduct an integrated erosion inventory and control program; identify corrective measures, prioritize rehabilitation areas; and assess program results		•	•	•
Implement shoreline erosion control with an emphasis on protecting cultural resources and public facilities in developed recreation areas		•	•	•
Limit or eliminate surface disturbing activities on soils with a high soil erosion potential		•	•	•
Post signs/install barriers to close primitive roads where erosion is a problem		•	•	•
Provide water access within the Developed Corridor via constructed trails and boardwalks		•	•	•
Vegetation and Weed Control				
Restore/rehabilitate closed roads and other disturbed areas		✳	✳	✳
Support private and volunteer efforts to plant native species in areas identified for enhancement or rehabilitation		•	•	•
Minimize acreage of irrigated grass in Potholes State Park to maintain quality shrub-steppe habitat		•	•	•
Monitor and evaluate the success of vegetation rehabilitation and natural revegetation projects for aquatic and terrestrial activities		•	•	•
Allow limited use of spot herbicide applications to kill small patches of watermilfoil affecting boat ramps, courtesy docks, and public swimming areas		•		•
Mechanically remove (by cutting) salt cedar trees (*Tamarix*) within the Dunes/Sand Islands, Upper and Lower Crab Creek Arms, North Potholes Reserve, and Upper West Arm management areas		•	•	•

Alternatives: A=No Action, B=Preferred , C=Preservation/Enhancement , D=Recreation Development

* Management action will vary by alternative
• Management action included in alternative

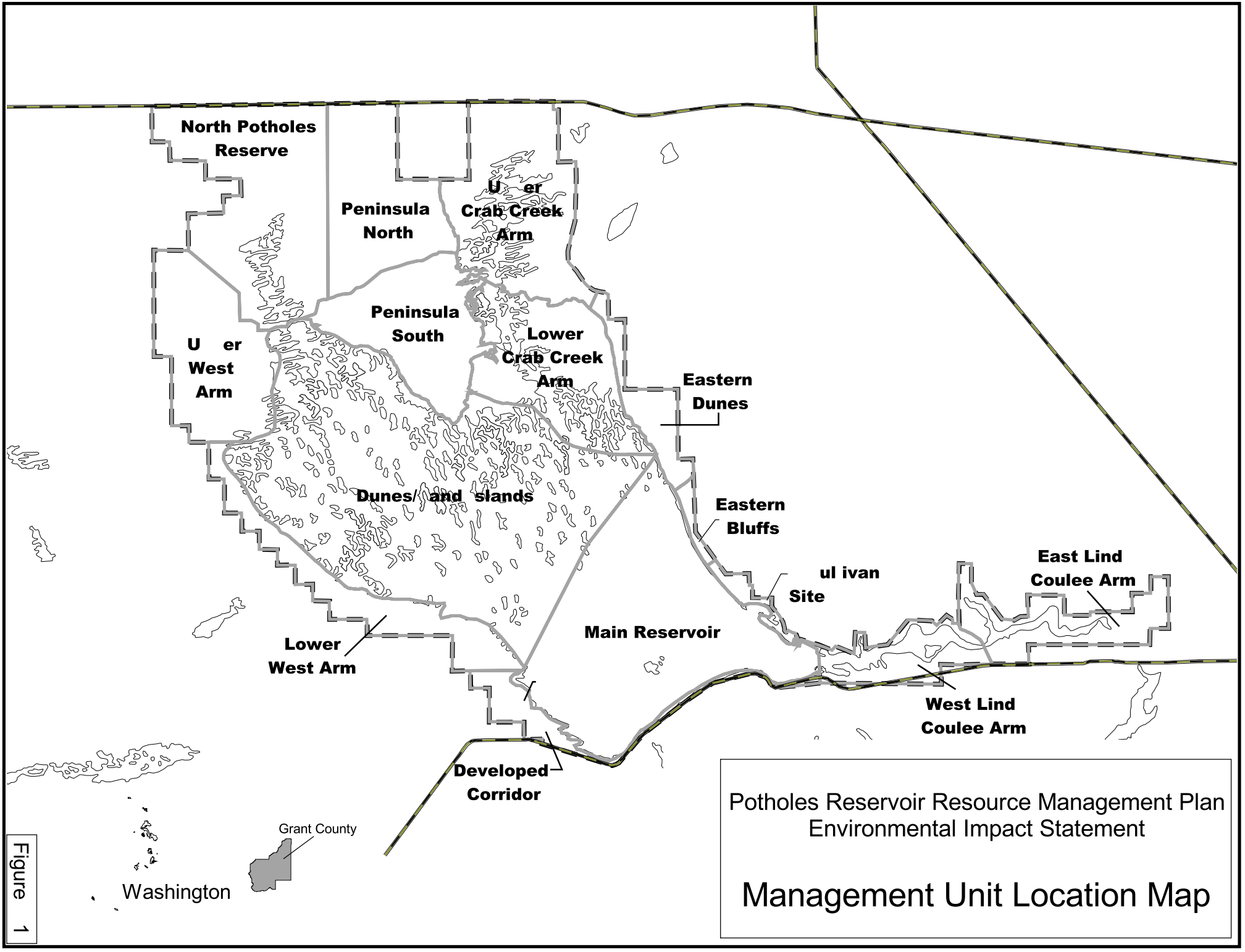

North Potholes Reserve
Peninsula North
U er Crab Creek Arm
Peninsula South
Lower Crab Creek Arm
U er West Arm
Eastern Dunes
Dunes/ and slands
Eastern Bluffs
ul ivan Site
East Lind Coulee Arm
Main Reservoir
Lower West Arm
West Lind Coulee Arm
Developed Corridor
Grant County
Washington
Figure 1
Potholes Reservoir Resource Management Plan
Environmental Impact Statement
Management Unit Location Map

Table 2-1
Summary of Alternatives and Management Actions
Potholes Reservoir RMP Final Environmental Impact Statement

Management Actions	Alternatives			
	A	B	C	D
Vegetation and Weed Control (continued)				
Allow herbicide applications to kill patches of purple loosestrife		•		•
Revegetate severely damaged areas in Lower Crab Creek Arm management area		•	•	•
Fish and Wildlife				
Designate the Upper West Arm and Upper Crab Creek Arm as "Habitat Management Areas" (HMAs) – Seasonally restrict watercraft to low speed/minimum wake operation from March 15 through June 30 – Seasonally prohibit dispersed camping from March 15 through June 30 to enhance wildlife nesting/breeding success		•		
Designate the Upper West Arm, Upper Crab Creek Arm, Peninsula South, and East Lind Coulee Arm as HMAs – Prohibit motorized watercraft in the Upper West Arm and East Lind Coulee Arm – Restrict watercraft to low speed/minimum wake operation in the Upper Crab Creek Arm year-round – Limit dispersed camping opportunities to specific sites designated and posted as "open" (see Figures 2.6.1, 2-6.2 and 2.6.3) – Continue existing road/motor vehicle closures within the Upper West Arm and limit motor vehicle travel in the Upper Crab Creek Arm, Peninsula South, and East Lind Coulee Arm to existing graveled roads			•	
Designate the Upper West Arm as an HMA – Seasonally restrict watercraft to low speed/minimum wake operation from March 15 through June 30 – Seasonally prohibit dispersed camping from March 15 through June 30 to enhance wildlife nesting/breeding success				•
Seasonally restrict watercraft to low-speed/minimum wake operation in the Dunes/Sand Islands management area from April 15 through June 30			•	
Maintain and enhance the diking system in North Potholes Reserve, Upper Crab Creek, and Upper West Arm management areas		•	•	•

Alternatives: A=No Action, B=Preferred , C=Preservation/Enhancement , D=Recreation Development

* Management action will vary by alternative
• Management action included in alternative

Table 2-1
Summary of Alternatives and Management Actions
Potholes Reservoir RMP Final Environmental Impact Statement

Management Actions	Alternatives			
	A	B	C	D
Fish and Wildlife (continued)				
Manage diked, "carp-free" waters for aquatic wildlife or a separate fishery from the main reservoir		•	•	•
Allow the limited use of rotenone in "carp-free" management waters		•	•	•
Identify and protect bald eagle perching and foraging winter habitat		•	•	•
Post signs to seasonally close specific areas, campsites or islands during critical wildlife breeding/nesting periods		•	•	•
Enhance bald eagle wintering/roosting habitat by planting additional trees (i.e., cottonwoods and willows)		•	•	•
Seasonally restrict public access of any type in the south/central portion of North Potholes Reserve from March 15 through May 30		•	•	
Eliminate roads and minimize trails through wetlands, meadows, riparian, and other sensitive wildlife habitats		•	•	•
Prohibit use of pesticides and herbicides harmful to fish and/or wildlife in HMAs		•	•	•
Water Quality				
Plan and prioritize future Clean Water Act (CWA) actions for Columbia Basin Project (CBP) waters and collaborate these actions through the Oversight Panel consisting of Reclamation, WDOE, EPA, and the CBP Irrigation District representatives: - Develop appropriate water quality standards for Potholes Reservoir including uses and criteria - Identify current and future water quality monitoring needs and determine which of these are appropriate for federal, state, or local accomplishment - Develop water quality management plans for those waters identified in Section IV D of the CWA	•	•	•	•
Continue historic and ongoing water quality monitoring programs; modify or expand these programs as necessary to make the determinations called for in Section IV A and IV B of the CWA	•	•	•	•

Alternatives: A=No Action, B=Preferred , C=Preservation/Enhancement , D=Recreation Development

* Management action will vary by alternative
• Management action included in alternative

Table 2-1
Summary of Alternatives and Management Actions
Potholes Reservoir RMP Final Environmental Impact Statement

Management Actions	Alternatives			
	A	B	C	D
Water Quality (continued)				
Review through the Oversight Panel the need for an expanded reservoir water quality and sediment sampling program to determine concentrations of potential contaminants of concern and the effects of mosquito control spraying activities and chemicals on reservoir water quality and biota		•	•	•
Review through the Oversight Panel the need for routine testing of fish flesh for concentrations of organic pesticides, metabolic by-products and heavy metals		•	•	•
Work with Grant County Mosquito Control District #1 to avoid or minimize mosquito spraying activities in the Upper West Arm, Upper Crab Creek Arm, and North Potholes Reserve management areas		•		
Work with Grant County Mosquito Control District #1 to avoid or minimize mosquito spraying activities in the Upper West Arm, Upper Crab Creek Arm, Peninsula South, East Lind Coulee Arm, and North Potholes Reserve management areas			•	
Work with Grant County Mosquito Control District #1 to avoid or minimize mosquito spraying activities in the Upper West Arm management area				•
Visual Quality				
Develop criteria for the appearance of structures and natural landscape preservation		•	•	•
Increase the promotion of "pack-in/pack-out" waste management practices	•	•	•	•
Remove illegal trash dumps located in the study area		•	•	•
Cultural Resources				
Work with Native Americans with interests at Potholes Reservoir to develop and display appropriate interpretive information on Native American use of the area		•	•	•

Alternatives: A=No Action, B=Preferred , C=Preservation/Enhancement , D=Recreation Development

* Management action will vary by alternative
• Management action included in alternative

Table 2-1
Summary of Alternatives and Management Actions
Potholes Reservoir RMP Final Environmental Impact Statement

Management Actions	Alternatives			
	A	B	C	D
Cultural Resources (continued)				
If cultural resources are found on Reclamation lands "open" to ORV use that are eligible for the National Register, the Grant County ORV Area boundary would be adjusted to protect identified cultural resources and/or sites		•		•
Conduct Class III surveys and prepare a Cultural Resource Management Plan (CRMP). The CRMP will outline specific actions and methods to protect cultural resources.		•	•	•
Coordinate with Native Americans with interests at Potholes Reservoir to prepare the CRMP and manage cultural resources.		•	•	•
Recreation				
Continue to allow dispersed, unregulated camping in all areas except North Potholes Reserve, Potholes State Park and Mar Don Resort provided that natural or cultural resources are not jeopardized	•			
Designate Peninsula North, Peninsula South, Lower Crab Creek Arm, Lower West Arm, and Dunes/Sand Islands (the WDFW may seasonally close specific islands) as "open" for dispersed camping		•		
Designate Upper Crab Creek Arm and Upper West Arm as "seasonally open" for dispersed camping. During seasonal closure period (March 15 - June 30), dispersed camping available at specific sites designated and signed as "open"		•		
Designate North Potholes Reserve, O'Sullivan Site, East Lind Coulee Arm, West Lind Coulee Arm, Developed Corridor, Eastern Dunes and Eastern Bluffs as "closed" to dispersed camping. Limit dispersed camping opportunities within these management areas to specific sites designated and signed as "open"		•		
Designate Peninsula North, Lower Crab Creek Arm, O'Sullivan Site, Lower West Arm, and Dunes/Sand Islands (the WDFW may seasonally close specific islands) as "open" for dispersed camping			•	

Alternatives: A=No Action, B=Preferred , C=Preservation/Enhancement , D=Recreation Development

* Management action will vary by alternative
• Management action included in alternative

Table 2-1
Summary of Alternatives and Management Actions
Potholes Reservoir RMP Final Environmental Impact Statement

Management Actions	Alternatives			
	A	B	C	D
Recreation (continued)				
Designate North Potholes Reserve, Upper Crab Creek Arm, Peninsula South, West Lind Coulee Arm, and Developed Corridor as "closed" to dispersed camping. Limit dispersed camping opportunities within these areas to specific sites designated and signed as "open"			•	
Designate Upper West Arm, Eastern Dunes, Eastern Bluffs, and East Lind Coulee Arm as "closed" to dispersed camping			•	
Designate Peninsula North, Peninsula South, Upper Crab Creek Arm (note: camping along the west shore of Moses Lake east of Sand Dunes Road would be limited to designated primitive camping areas along the lake shoreline), Lower Crab Creek Arm, Lower West Arm, Dunes/Sand Islands (the WDFW, may seasonally close specific islands), Eastern Dunes, Eastern Bluffs, and East Lind Coulee Arm as "open" for dispersed camping				•
Designate the Upper West Arm HMA as "seasonally open" for dispersed camping. The seasonal closure would extend from March 15 - June 30				•
Designate North Potholes Reserve and West Lind Coulee Arm as "closed" to dispersed camping. Limit dispersed camping opportunities within these areas to specific sites designated and signed as "open"				•
Designate the Developed Corridor and O'Sullivan Site as "closed" to dispersed camping				•
Designate and manage primitive camping areas (see Fig. 2-7.1 and 2.7.2 for specific site locations)				•
Annually monitor the impacts associated with dispersed camping and recreational use	•	•	•	•
Unless otherwise posted, adopt and enforce a reservoir-wide 15-day camping stay limit outside developed recreation areas		•		•
Unless otherwise posted, adopt and enforce a reservoir-wide 10-day stay limit outside developed recreation areas			•	
Provide centrally located toilets (permanent or seasonal) to meet human waste disposal needs in high use areas		✳	✳	✳
Provide for the future expansion of recreation facilities and services within Potholes State Park (see Figure 2-3)	•	•	•	•
Provide a developed recreation area at O'Sullivan Site - North as a unit of Potholes State Park (see Figures 2-4.1 and 2-5)		•		•

Alternatives: A=No Action, B=Preferred , C=Preservation/Enhancement , D=Recreation Development

* Management action will vary by alternative
• Management action included in alternative

Table 2-1
Summary of Alternatives and Management Actions
Potholes Reservoir RMP Final Environmental Impact Statement

Management Actions	Alternatives			
	A	B	C	D
Recreation (continued)				
No developed recreation area would be constructed at the O'Sullivan Site. Instead, the area would be transferred to the WDFW and managed for dispersed camping and day use. Two permanent vault toilets would be centrally located in the O'Sullivan Beach area			•	
Develop additional interpretive trails and overview sites to expand "Watchable Wildlife" opportunities	✳	✳	✳	✳
Provide courtesy docks at the Glen Williams boat launch		•	•	•
Provide courtesy docks at the Blythe boat launch				•
Surface the informal (cartop) boat launch at Blythe		•		•
Assess the feasibility of modifying/reconstructing the main boat launch at Blythe		•		•
Seasonally restrict public access of any type in the south/central portion of North Potholes Reserve from March 15 - May 30		•	•	
Allow non-motorized access and floating device use *year-round* within North Potholes Reserve				•
Open two miles of primitive road to motorized travel to improve public recreation access in the East Lind Coulee Arm (see Figure 2-7.2)				•
Work with WDOT to site and develop an asphalt-surfaced bicycle/pedestrian trail between Potholes State Park and O'Sullivan Dam	•	•	•	•

Alternatives: A=No Action, B=Preferred , C=Preservation/Enhancement , D=Recreation Development

* Management action will vary by alternative
• Management action included in alternative

Table 2-1
Summary of Alternatives and Management Actions
Potholes Reservoir RMP Final Environmental Impact Statement

Management Actions	Alternatives			
	A	B	C	D
Recreation (continued)				
Provide signs directing visitors to all developed recreation areas and "designated" dispersed camping areas/sites at key road intersections	✳	✳	✳	✳
Install "No Parking/No Camping" signs in immediate vicinity of the Powerline Boat Launch to improve vehicle/trailer maneuverability and traffic flow		•	•	•
Install a permanent vault toilet at the Powerline Boat Launch		•	•	•
Improve the Powerline boat launch and parking area				•
Provide for the periodic dredging/removal of sediments deposited at the base of public boat launches		•		•
Provide for the periodic dredging/removal of sediments deposited at the base of public boat launches within the Developed Corridor			•	
Land Use and Administration				
Modify the land use agreement between the WDFW and Grant County to operate and maintain an ORV Area to include only those Reclamation lands located in the existing "Green" and "Yellow" zones; exclude those lands (approximately 105 acres) in the Eastern Bluffs management area that are included in the existing ORV Area lease, but situated outside the "Green Zone" boundary	•			•
Modify the land use agreement between the WDFW and Grant County to operate and maintain an ORV Area to include only those Reclamation lands within the Eastern Dunes management area and south half of Section 10, T18N, R28E		•		
Modify the existing land use agreement between the WDFW and Grant County to operate and maintain an ORV Area to include only those Reclamation lands in the south half of Section 10, T18N, R28E (320 acres)			•	

Alternatives: A=No Action, B=Preferred , C=Preservation/Enhancement , D=Recreation Development

* Management action will vary by alternative
• Management action included in alternative

Table 2-1
Summary of Alternatives and Management Actions
Potholes Reservoir RMP Final Environmental Impact Statement

Management Actions	Alternatives			
	A	B	C	D
Land Use and Administration (continued)				
Transfer "lead agency" recreation management responsibilities within the Developed Corridor to the SPRC				•
Transfer "lead agency" recreation management responsibilities at the O'Sullivan Site to the WDFW			•	
Off-Road Vehicle (ORV) Management				
Continue to limit ORV use to existing "Yellow" and "Green" zone boundaries and restrictions; continue "Red Zone" year-round ORV closure (see Figures 2-2 and 2-2.1)	•			
Modify the Grant County ORV Area boundary to include the Eastern Dunes management area, 320 acres of Reclamation land outside the RMP study area in the south half of Section 10, T18N, R28E and Grant County ORV Area lands. Except for maintenance and administrative use, 919 acres of the Lower Crab Creek Arm management area would be closed to motor vehicle travel/ORV use (see Figures 2-4.1 and 2-4.3)		•		
Modify the Grant County ORV Area boundary to include 320 acres of Reclamation land outside the RMP study area in the south half of Section 10, T18N, R28E and Grant County ORV Area lands. All Reclamation lands within the RMP study area would be designated "closed to ORV use" (see Figures 2-6.1 and 2-6.3)			•	
Retain the existing Grant County ORV Area boundary (includes the Eastern Dunes and Lower Crab Creek Arm management areas, 320 acres of Reclamation lands outside the RMP study area in the south half of Section 10, T18N, R28E and Grant County ORV Area lands). Within the Lower Crab Creek Arm management area, retain the existing ORV travel restriction "seasonally open" from July 1 to October 1, but limit ORV use to designated roads and trails only (see Figures 2-7.1 and 2-7.3)				•
Keep the Powerline Road "seasonally open" to motor vehicle travel/ORV use from July 1 through October 1	•			

Alternatives: A=No Action, B=Preferred , C=Preservation/Enhancement , D=Recreation Development

* Management action will vary by alternative
• Management action included in alternative

Table 2-1
Summary of Alternatives and Management Actions
Potholes Reservoir RMP Final Environmental Impact Statement

Management Actions	Alternatives			
	A	B	C	D
Off-Road Vehicle (ORV) Management (continued)				
Designate and keep the eastern portion of Powerline Road "seasonally open" to motor vehicle travel/ORV use unless future closure or other control measures are needed to achieve resource management objectives		•		
Close the Powerline Road to motor vehicle travel/ORV use except for administrative, maintenance or emergency purposes			•	
Designate and keep the Powerline Road "open year-round" to motor vehicle travel/ORV use				•
Designate four ORV access routes between Sand Dunes Road and the west shore of Moses Lake as "open" to ORV riding; outside these four travel corridors, continue "Red Zone" year-round ORV closure				•
Provide an ORV access route in Eastern Bluffs management area to connect the Eastern Dunes management area with the O'Sullivan Site-North				•
Inventory and evaluate the presence of cultural resources and sites within the Eastern Dunes management area; modify ORV Area boundaries accordingly		•		
Inventory and evaluate the presence of cultural resources and sites within the Eastern Dunes and Eastern Bluffs management areas; modify ORV Area boundaries accordingly				•
Restore/revegetate severely damaged areas closed to ORV use	•	•	•	•
Fence the "Yellow" and "Green" zone boundary to prevent indiscriminate ORV entry into the Lower Crab Creek Arm management area; provide 3-4 access gates for authorized entry	•	•	•	•

Alternatives: A=No Action, B=Preferred , C=Preservation/Enhancement , D=Recreation Development

* Management action will vary by alternative
• Management action included in alternative

Table 2-1
Summary of Alternatives and Management Actions
Potholes Reservoir RMP Final Environmental Impact Statement

Management Actions	Alternatives			
	A	B	C	D
Off-Road Vehicle (ORV) Management (continued)				
Fence the east side of Sand Dunes Road between South Outlet and Powerline Road to prevent indiscriminate ORV entry		•	•	•
Grazing Management				
Limit the grazing permit program at Potholes Reservoir to the existing 7,400-acre authorization under grazing permit TP-01		•		•
Phase-out WDFW's grazing permit program by allowing the existing permit (TP-01) to expire without renewal			•	
Keep livestock forage utilization on the 6,700-acre pasture within the North Potholes Reserve and Peninsula North management areas limited to no more than 600 AUMs from November 1 - March 15	•	•		•
Keep livestock forage utilization on the 700-acre pasture within the Upper West Arm management area limited to no more than 600 AUMs from March 15 to April 15	•	•		•
Construct fences, where needed, to prevent livestock trespassing onto Reclamation lands from adjacent lands			•	
Visitor Information and Interpretation				
Provide managed access, turnouts, signs, and/or interpretive trails and displays to enhance "watchable wildlife" viewing opportunities (see Figures 2-1, 2-4, 2-6, and 2-7)	✳	✳	✳	✳
Develop a public education/interpretive program to increase the public's awareness of Potholes Reservoir natural resources		•	•	•
Install signs at all developed recreation areas, boat launches, and other high public use areas		•	•	•
Post or modify existing signs to inform the public of relevant Grant County ordinances and regulations. Post "Pack-In/Pack-Out" signs	•	•	•	•
Develop an overall visitor guide/map for the Potholes Reservoir area		•	•	•

Alternatives: A=No Action, B=Preferred , C=Preservation/Enhancement , D=Recreation Development

* Management action will vary by alternative
• Management action included in alternative

Table 2-1
Summary of Alternatives and Management Actions
Potholes Reservoir RMP Final Environmental Impact Statement

Management Actions	Alternatives			
	A	B	C	D
Visitor Information and Interpretation (continued)				
Pursue the cooperative development of an "Environmental Education Center" within or near the Developed Corridor		•	•	•
Install additional "ORV Area" signs to clearly direct off-road vehicle users to the authorized Grant County ORV Area		•	•	•
Public Health and Safety/Environmental Protection				
Provide "minimum basic" on-shore restroom facilities (i.e., seasonal or permanent toilets) in high use areas where improper human waste disposal practices pose a public health or environmental hazard	✳	✳	✳	✳
Close roads (seasonally or permanently) in environmentally sensitive areas or where significant adverse environmental impacts have occurred	✳	✳	✳	✳
Install road gates, fencing, signs, and buoys as needed to implement seasonal and permanent closures		✳	✳	✳
Increase the public's awareness of WDFW's "pack-in/pack-out" policy	•	•	•	•
Construct trails and boardwalks to control public access/foot traffic through wetland/riparian habitats in high use recreation areas (i.e., within the Developed Corridor)	✳	✳	✳	✳
Perform minor road improvements (i.e., grading and/or gravel placement) to improve vehicular access, public safety, and/or reduce soil erosion where continue road access is desirable		•	•	•
Permanently close and/or revegetate primitive roads not needed for public or agency access			•	
Limit "Yellow Zone" motorized travel/ORV use to designated roads and trails only to protect wildlife habitat.				•
Maintain gravel primitive road network to discourage random motor vehicle travel	•	•	•	•
No additional firearm discharge restrictions. Currently, the discharge of firearms is prohibited in the ORV Area except from September 1 to February 1 and no guns are allowed in North Potholes Reserve and Potholes State Park, year-round.	•			•

Alternatives: A=No Action, B=Preferred , C=Preservation/Enhancement , D=Recreation Development

* Management action will vary by alternative
• Management action included in alternative

Table 2-1
Summary of Alternatives and Management Actions
Potholes Reservoir RMP Final Environmental Impact Statement

Management Actions	Alternatives			
	A	B	C	D
Public Health and Safety/Environmental Protection (continued)				
Prohibit the discharge of firearms in areas of wildlife species conflicts or for reasons of public safety in the Lind Coulee Arm, watchable wildlife areas, and other high use public recreation areas		•		
Prohibit the discharge of firearms reservoir-wide except from September 1 to February 1. Continue year-round prohibition on guns in North Potholes Reserve and Potholes State Park			•	

Alternatives: A=No Action, B=Preferred , C=Preservation/Enhancement , D=Recreation Development

* Management action will vary by alternative
• Management action included in alternative

Table 2-2
Key Management Actions by Management Area

MANAGEMENT AREA	ALTERNATIVE A NO ACTION	ALTERNATIVE B PREFERRED	ALTERNATIVE C PRESERVATION/ ENHANCEMENT	ALTERNATIVE D RECREATION DEVELOPMENT
NORTH POTHOLES RESERVE	Emphasize existing regulations: • Open year-round for walk-in and non-motorized day use. • Prohibit floating device use. • Closed to dispersed camping except at Job Corps Dike • Maintain grazing permit TP-01.	• Close to dispersed camping except at designated sites. • Restrict floating device use. • Seasonally restrict public access in south/central portion (3/15-5/30). • Maintain and enhance diking system. • Maintain grazing permit TP-01. • Develop North Potholes Reserve "watchable wildlife" area	• Close to dispersed camping except at designated sites. • Prohibit floating device use. • Seasonally restrict public access in south/central portion (3/15-5/30). • Maintain and enhance diking system. • Cancel grazing permit TP-01. • Revegetate primitive roads not needed for public or agency access.	• Close to dispersed camping except at designated sites. • Allow non-motorized boats and other floating devices. • Allow year-round public access in south/central portion. • Maintain and enhance diking system. • Maintain grazing permit TP-01. • Develop North Potholes Reserve "watchable wildlife" area.
PENINSULA NORTH	• Open year-round to dispersed camping • Maintain grazing permit TP-01. • Develop "watchable wildlife" interpretive vehicle route	Same as Alternative A	Same as Alternative A except • Cancel grazing permit TP-01.	Same as Alternative A
PENINSULA SOUTH	• Open year-round to dispersed camping. • Develop "watchable wildlife" interpretive vehicle route.	• Open year-round to dispersed camping. • Develop "watchable wildlife" interpretive vehicle route. • Provide vault toilet at Powerline Boat Launch.	• Close to dispersed camping except at designated sites. • Develop "watchable wildlife" interpretive vehicle route. • Designate as HMA. • Provide vault toilet at Powerline Boat Launch.	• Open year-round to dispersed camping. • Develop "watchable wildlife" interpretive vehicle route. • Provide vault toilet at Powerline Boat Launch. • Improve Powerline Boat Launch and parking area.

Table 2-2
Key Management Actions by Management Area

MANAGEMENT AREA	ALTERNATIVE A NO ACTION	ALTERNATIVE B PREFERRED	ALTERNATIVE C PRESERVATION/ ENHANCEMENT	ALTERNATIVE D RECREATION DEVELOPMENT
UPPER WEST ARM	• Open year-round to dispersed camping. • Maintain grazing permit TP-01.	• Seasonally closed to dispersed camping (3/15-6/30). • Maintain grazing permit TP-01. • Seasonal minimum wake restriction for watercraft (3/15-6/30). • Designate as HMA. • Maintain and enhance diking system.	• Close to dispersed camping. • Cancel grazing permit TP-01. • No motorized watercraft. • Designate as HMA. • Maintain and enhance diking system. • Revegetate closed roads.	Same as Alternative B
LOWER WEST ARM	• Open year-round to dispersed camping.	Same as Alternative A	Same as Alternative A	• Open year-round to dispersed camping. • Develop "watchable wildlife" interpretive hiking trail.
DUNES/SAND ISLANDS	• Open year-round to dispersed camping.	• Open year-round to dispersed camping. • WDFW may seasonally close specific islands during critical wildlife breeding/ nesting periods or to improve vegetation restoration efforts.	• Open year-round to dispersed camping. • WDFW may seasonally close specific islands during critical wildlife breeding/nesting periods or to improve vegetation restoration efforts. • Seasonal minimum wake restriction for watercraft (4/15-6/30).	Same as Alternative B
MAIN RESERVOIR	No special management.	No special management	No special management.	No special management.

Table 2-2
Key Management Actions by Management Area

MANAGEMENT AREA	ALTERNATIVE A NO ACTION	ALTERNATIVE B PREFERRED	ALTERNATIVE C PRESERVATION/ ENHANCEMENT	ALTERNATIVE D RECREATION DEVELOPMENT
UPPER CRAB CREEK ARM	• Open year-round to dispersed camping. • Closed to ORV use.	• Seasonally close to dispersed camping (3/15-6/30) except at designated sites. • Close to ORV use. • Provide West Lake/North Outlet "watchable wildlife" area. • Designate as HMA. • Seasonal minimum wake restriction for watercraft (3/15-6/30). • Maintain and enhance diking system. • Fence east side of Sand Dunes Road between South Outlet and Powerline Road to prevent indiscriminate ORV entry. Provide parking turnouts and non-motorized access routes leading to west shore of Moses Lake. • Designate and manage seven dispersed camping areas including North and South Outlets and five along west shore of Moses Lake.	• Close to dispersed camping except at designated sites. • Close to ORV use. • Provide West Lake/North Outlet "watchable wildlife" area. • Designate as HMA. • Year-round minimum wake restriction for watercraft • Maintain and enhance diking system. • Fence east side of Sand Dunes Road between South Outlet and Powerline Road to prevent indiscriminate ORV entry. Provide parking turnouts and non-motorized access routes to west shore of Moses Lake (day-use only). • Designate and manage dispersed camping areas at North and South Outlets. • Close and revegetate primitive roads not needed for public or agency access.	• Open year-round to dispersed camping except east of Sand Dunes Road. • Close to ORV use. • Provide West Lake/North Outlet "watchable wildlife" area. • Maintain and enhance diking system. • Fence east side of Sand Dunes Road between South Outlet and Powerline Road to prevent indiscriminate ORV entry. Provide ORV access routes leading to west shore of Moses Lake. • Develop and manage seven primitive camping areas

Table 2-2
Key Management Actions by Management Area

MANAGEMENT AREA	ALTERNATIVE A NO ACTION	ALTERNATIVE B PREFERRED	ALTERNATIVE C PRESERVATION/ ENHANCEMENT	ALTERNATIVE D RECREATION DEVELOPMENT
LOWER CRAB CREEK ARM	• Open year-round to dispersed camping. • Open to motor vehicle travel/ ORV use from July 1 - October 1. • Keep the Powerline Road seasonally open to motor vehicle travel/ORV use from July 1 - October 1.	• Open year-round to dispersed camping. • 919 acres closed to motor vehicle travel/ ORV use. • Keep eastern portion of Powerline Road seasonally open to motor vehicle travel/ORV use. • Develop interpretive trail.	• Open year-round to dispersed camping. • Close to motor vehicle travel/ ORV use. • Close the Powerline Road to motor vehicle travel/ORV use except for maintenance or administrative use. • Develop interpretive trail	• Open year-round to dispersed camping. • Open to motor vehicle travel/ ORV use from July 1 - October 1. • Keep the Powerline Road open year-round to motor vehicle travel/ORV use. • Develop interpretive trail. • Limit ORV use to designated roads and trails.
EASTERN DUNES	• Open year-round to dispersed camping. • Open to motor vehicle travel/ ORV use year-round. • Fence west boundary to control indiscriminate ORV entry into Lower Crab Creek Arm.	• Close to dispersed camping. • Open to motor vehicle travel/ ORV use year-round. • Fence west boundary to control indiscriminate ORV entry into Lower Crab Creek Arm.	• Close to dispersed camping. • Close to motor vehicle travel/ ORV use. • Fence west boundary to control indiscriminate ORV entry into Lower Crab Creek Arm.	Same as Alternative A
EASTERN BLUFFS	• Exclude approximately 105 acres of land located outside the "Green" zone from current ORV Area lease. • Open year-round to dispersed camping. • Closed to ORV use.	• Close to dispersed camping. • Close to motor vehicle travel/ ORV use. • Install road gates to prevent motor vehicle entry.	Same as Alternative B	• Open year-round to dispersed camping. • Provide ORV access route to connect Eastern Dunes and O'Sullivan Site. • Limit motor vehicle travel/ORV use to ORV access route.

Table 2-2
Key Management Actions by Management Area

MANAGEMENT AREA	ALTERNATIVE A NO ACTION	ALTERNATIVE B PREFERRED	ALTERNATIVE C PRESERVATION/ ENHANCEMENT	ALTERNATIVE D RECREATION DEVELOPMENT
DEVELOPED CORRIDOR	• Open year-round to dispersed camping except in Potholes State Park and Mar Don Resort. • Allow campground expansion in Potholes State Park. • Develop asphalt-surfaced bike/pedestrian trail between Potholes State Park and O'Sullivan Dam.	• Close to dispersed camping. • Allow campground expansion in Potholes State Park. • Develop asphalt-surfaced bike/pedestrian trail between Potholes State Park and O'Sullivan Dam. • Allow camping at Blythe Boat Launch. • Improve cartop boat launch at Blythe.	• Close to dispersed camping. • Allow campground expansion in Potholes State Park. • Develop asphalt-surfaced bike/pedestrian trail between Potholes State Park and O'Sullivan Dam. • Allow camping at Blythe Boat Launch.	• Close to dispersed camping. • Allow campground expansion in Potholes State Park. • Develop asphalt-surfaced bike/pedestrian trail between Potholes State Park and O'Sullivan Dam. • Transfer "lead agency" management to SPRC. • Improve cartop boat launch and add courtesy docks at Blythe. (SPRC fee area)
O'SULLIVAN SITE - NORTH	• Open year-round to dispersed camping.	• Close to dispersed camping. • Develop as unit of Potholes State Park. Until developed: • Provide seasonal toilets • Fence parking area • Day Use only	• Open year-round to dispersed camping. • Transfer management to WDFW. • Install two permanent vault toilets in O'Sullivan Beach area	Same as Alternative B
O'SULLIVAN SITE - SOUTH	• Open year-round to dispersed camping.	• Designate and manage as dispersed camping area until O'Sullivan Site - North is developed as Unit of Potholes State Park	• Open year-round to dispersed camping • Transfer management to WDFW	Same as Alternative B

Table 2-2
Key Management Actions by Management Area

MANAGEMENT AREA	ALTERNATIVE A NO ACTION	ALTERNATIVE B PREFERRED	ALTERNATIVE C PRESERVATION/ ENHANCEMENT	ALTERNATIVE D RECREATION DEVELOPMENT
WEST LIND COULEE ARM	• Open year-round to dispersed camping.	• Close to dispersed camping except at designated sites. • Designate and manage seven dispersed camping areas. • Provide seasonal toilets in high-use areas. • Allow camping at Glen Williams and Road "M" Boat Launch sites. • Provide courtesy docks at Glen Williams Boat Launch.	• Close to dispersed camping except at designated sites. • Designate and manage five dispersed camping areas. • Provide seasonal toilets in high-use areas. • Allow camping at Glen Williams and Road "M" Boat Launch sites. • Provide courtesy docks at Glen Williams Boat Launch. • Close and/or revegetate primitive roads not needed for public or agency access.	• Close to dispersed camping except at designated sites. • Designate and manage two dispersed camping areas. • Provide seasonal or permanent vault toilets in high-use areas. • Allow camping at Glen Williams and Road "M" Boat Launch sites. • Provide courtesy docks at Glen Williams Boat Launch. • Designate and manage five primitive camping areas.
EAST LIND COULEE ARM	• Open year-round to dispersed camping. • Develop Lind Coulee North Arm "watchable wildlife" area.	• Close to dispersed camping except at designated sites. • Develop Lind Coulee North Arm "watchable wildlife" area.	• Close to dispersed camping. • Develop Lind Coulee North Arm "watchable wildlife" area. • Designate as HMA. • No motorized watercraft. • Close and revegetate primitive roads not needed for public or agency access.	• Open year-round to dispersed camping. • Develop Lind Coulee North Arm "watchable wildlife" area. • Provide seasonal toilets in high-use areas. • Designate and manage one dispersed camping area. • Open two miles of closed primitive road to motor vehicle travel.

Table 2-2
Key Management Actions by Management Area

MANAGEMENT AREA	ALTERNATIVE A NO ACTION	ALTERNATIVE B PREFERRED	ALTERNATIVE C PRESERVATION/ ENHANCEMENT	ALTERNATIVE D RECREATION DEVELOPMENT
SUMMARY	Maintains recreation facilities at current levels outside of Potholes State Park. Retains the existing Grant County ORV Area. Recreation improvements made as-needed and as funding permits. Land use and resource management decisions made on an *ad hoc* basis.	Establishes two HMAs. Provides for future recreation development, moderately controlled access and dispersed camping, a smaller ORV Area, as well as the preservation and enhancement of natural and cultural resources.	Establishes four HMA's, minimizes recreation development, and closes all Reclamation lands within the RMP study area to ORV use. Excludes recreation development at the O'Sullivan Site and transfers management to WDFW. Closes and rehabilitates primitive roads not needed for public or agency access.	Establishes one HMA. Expands range of recreation opportunities and facility development. Retains the existing Grant County ORV park and provides ORV access routes to the west shore of Moses Lake and through the Eastern Bluffs management area.

Table 2-3
Comparison of Environmental Effects by Alternative
Potholes Reservoir

Environmental Indicator	Environmental Effects			
	Alternative A	**Alternative B**	**Alternative C**	**Alternative D**
Air Quality (4.1)				
Attainment of National Ambient Air Quality Standards and Criteria	yes	yes	yes	yes
Soils (4.2)				
Soil Productivity potential loss	high	moderate	low	high
Soil Erosion, disturbance and compaction increase probability	high	moderate	low	high
Surface Water Quality (4.3.3)				
Potential for change in turbidity, sedimentation, water temperature, and non-point contamination	moderate	low	moderate	low
Ground Water Quality (4.3.4)				
Potential for change in recharge rates and flow patterns, and changes in water chemistry from organic or inorganic contamination.	low	low	low	low
Vegetation (4.4)				
Acres of suitable habitat managed for:				
- development (State Parks)	11	91	11	3,354
- ORV parks	3,354	2,435	1,227	13.9
- roads/trails	2.5	3.3	-18.2 (less)	52
- agriculture	52	52	52	7,400
- grazing	7,400	7,400	0	
Acres of designated Habitat Management Areas	0	3,950	7,166	1,964

Alternatives: A=No Action, B=Preferred Alternative, C=Natural Resource Conservation , D=Recreation Development

Table 2-3
Comparison of Environmental Effects by Alternative
Potholes Reservoir

Environmental Indicator	Environmental Effects			
	Alternative A	**Alternative B**	**Alternative C**	**Alternative D**
Vegetation (4.4) (continued)				
potential for reduction in noxious weed	low	moderate	high	low
Affect on Special Status Plant Species	low beneficial effect	moderate beneficial effect	high beneficial effect	low beneficial effect
Wildlife (4.5)				
Potential for adverse effects to wildlife from loss of suitable habitat and changes in recreational use	high	moderate	low	moderate-high
Special Status Wildlife Species	low beneficial effect	moderate beneficial effect	high beneficial effect	low beneficial effect
Fish (4.6)				
Overall fishery disturbance, harassment and habitat destruction	moderate - high	moderate	low	high
Cultural (4.8)				
Potential disturbance factors affecting cultural site integrity (non-inventoried areas, undiscovered)	high	moderate	low	high
Indian Trust Assets (4.9)				
Change in Indian Trust Assets	no change	no change	no change	no change
Visual Quality (4.10)				
Change in visual quality and scenic quality rating	no change	no change	no change	no change

Alternatives: A=No Action, B=Preferred Alternative, C=Natural Resource Conservation , D=Recreation Development

Table 2-3
Comparison of Environmental Effects by Alternative
Potholes Reservoir

Environmental Indicator	Environmental Effects			
	Alternative A	**Alternative B**	**Alternative C**	**Alternative D**
Noise (4.11)				
Increased Levels	no change	no change	no change	no change
Land Use (4.12)				
Study area land base impacted by land use change	139	5,827	15,003	2,744
Recreation (4.13)				
Acres of dispersed camping available - open year round/seasonal - closed except designated	 14,753 3,831	 12,595 6,529	 6,164 12,420	 13,948 4,636
Acres of increased developed recreation opportunities/capacity to accommodate public demand	11	91	11	91
Fishing access	no change	improved	less than existing	greatly improved
Acres of off-road vehicle (ORV) riding opportunities available	3,354	2,435	1,227	3,354
Social Economic Resources (4.14)				
Degree of Acceptability	moderate	moderate	low	moderate-high

Alternatives: A=No Action, B=Preferred Alternative, C=Natural Resource Conservation , D=Recreation Development

- Evaluate the need to control the spread of Russian olive (*Elaeagnus angustifolia*).

- Continue to maintain a baseline for reservoir water quality data at existing inlet and outlet sampling stations for routine water quality parameters (pH, alkalinity, nitrates, phosphates, etc.).

- Plan and prioritize future actions for Columbia Basin Project (CBP) waters and collaborate these actions through the Oversight Panel consisting of Reclamation, WDOE, Environmental Protection Agency (EPA), and CBP Irrigation District representatives. These actions include the following.

  - Develop appropriate water quality standards for Potholes Reservoir including uses and criteria.

  - Identify current and future water quality monitoring needs and determine which of these are appropriate for federal, state, or local accomplishment.

  - Develop water quality management plans for those waters identified in Section IV D of the MOA.

- Continue historic and ongoing water quality monitoring programs; modify or expand these programs as necessary to make the determinations called for in Section IV A and IV B of the CWA.

- Semiannually review reservoir water quality data through the Oversight Panel and modify water quality monitoring needs as necessary.

- Potholes Reservoir (Grant County) is within a Washington Department of Ecology (WDOE) sanctioned GWMA. Coordinate actions developed during the "Ground Water Management Area" process with Potholes Reservoir management.

- Seek funding for fishery studies designed to determine what factors are limiting the reservoir fishery and what regulatory and/or habitat improvement measures could be taken to reverse the present decline in fish species, populations, and angler success rates. The impact of fish-eating birds (i.e., cormorants) on the reservoir fishery will also be investigated.

- Coordinate with the WDFW, Washington Natural Heritage Program, WDNR, and Bureau of Land Management (BLM) to exchange information on local rare plant distributions and status.

Cultural Resources:

- Conduct Class III surveys and prepare a Cultural Resource Management Plan (CRMP). The CRMP will outline specific actions and methods to protect cultural resources.

- Coordinate with Native Americans with interests at Potholes Reservoir to prepare the CRMP and manage cultural resources.

Recreation:

- Identify and implement a fee structure, within current legal authorities, to generate additional revenues for SPRC and WDFW operation, maintenance, and management functions.

- Coordinate and work with the Washington Department of Transportation (WDOT) to address congestion problems along State Route 262 during peak recreation periods.

- Provide accessible facilities for persons with disabilities in all new developments or redevelopments as required by Section 504 of the Architectural Barriers Act.

- Provide a fishing jetty or breakwater for the physically challenged in Potholes State Park.

- Provide additional campsites and associated facilities within Potholes State Park.

- Continue to manage the Dunes/Sand Islands management area for dispersed recreation (e.g., camping, wildlife observation, picnicking, and sunbathing). No recreation improvements or sanitation facilities would be provided and trash would continue to be managed under a pack-in/pack-out policy.

- Hunting would continue to be allowed on all Reclamation lands consistent with existing State and local regulations. Public hunting and trapping is currently

allowed throughout the RMP study area except within North Potholes Reserve and Potholes State Park.

If human waste and trash disposal becomes a significant public health concern in the future, area and site closure, seasonal portable or floating toilets, and/or other management strategies would be examined by the WDFW and the Reclamation and corrective action(s) taken. Opportunities for public review and comment would be provided prior to adopting and implementing any management changes affecting public use.

- Work with the WDOT to complete a 1.7 mile asphalt-surfaced bicycle/pedestrian trail between Potholes State Park and O'Sullivan Dam (see Figure 2-2.1). This phase of the trail would link the Mar Don Resort and Potholes State Park.

Land Use and Administration:

- Continue to meet all contractual obligations of the 1968 contracts between the U.S. and Columbia Basin Project irrigation districts.

- Continue to operate Potholes Reservoir in accordance with Reclamation law and the Columbia Basin Project Act dated March 10, 1943 (Chapter 14, 57 STAT, 14).

- Continue to administer Reclamation lands and waters through an updated MOA between the United States and the State of Washington. Day-to-day resource and recreation management activities will continue to be provided by the SPRC and WDFW with oversight by the Reclamation.

- Continue the 52-acre agricultural lease program in the Lind Coulee Arm for the benefit of wildlife. The purpose of the lease program (to produce food and cover for wildlife and manage the land for continued multi-purpose recreation), the existing prohibition on livestock grazing, and the requirement to keep the land open at all times for lawful public hunting and other recreational uses will be retained in all new or renewed leases. Lease administration will remain with the WDFW.

- Renew the 30-acre recreational lease agreement between the SPRC and the Washington Department of Natural Resources (WDNR) to operate and maintain a recreational resort on Reclamation land. The existing Mar Don Resort

occupies both Reclamation and WDNR lands and is operated under a lease agreement (No. 62395) issued and administered by the WDNR.

- Update the 1997 Memorandum of Understanding (MOU) between the WDFW and Grant County Mosquito Control District #1 to reflect changes in resource needs (i.e., leopard frogs) and mosquito control technologies. The Reclamation should review and agree with the changes in the MOU scheduled for 2002.

Under the existing MOU, the District has agreed to prepare a "Master Plan" outlining their annual spraying operations and to use biological pesticides as their primary pesticide. The WDFW has agreed to mark protected waters with buoys.

- Continue integrated pest management for mosquito control in accordance with an updated and renewed MOU. WDFW's goal is to avoid or minimize the use of chemical controls that could impact non-target species important to the food chains of local fish and wildlife species.

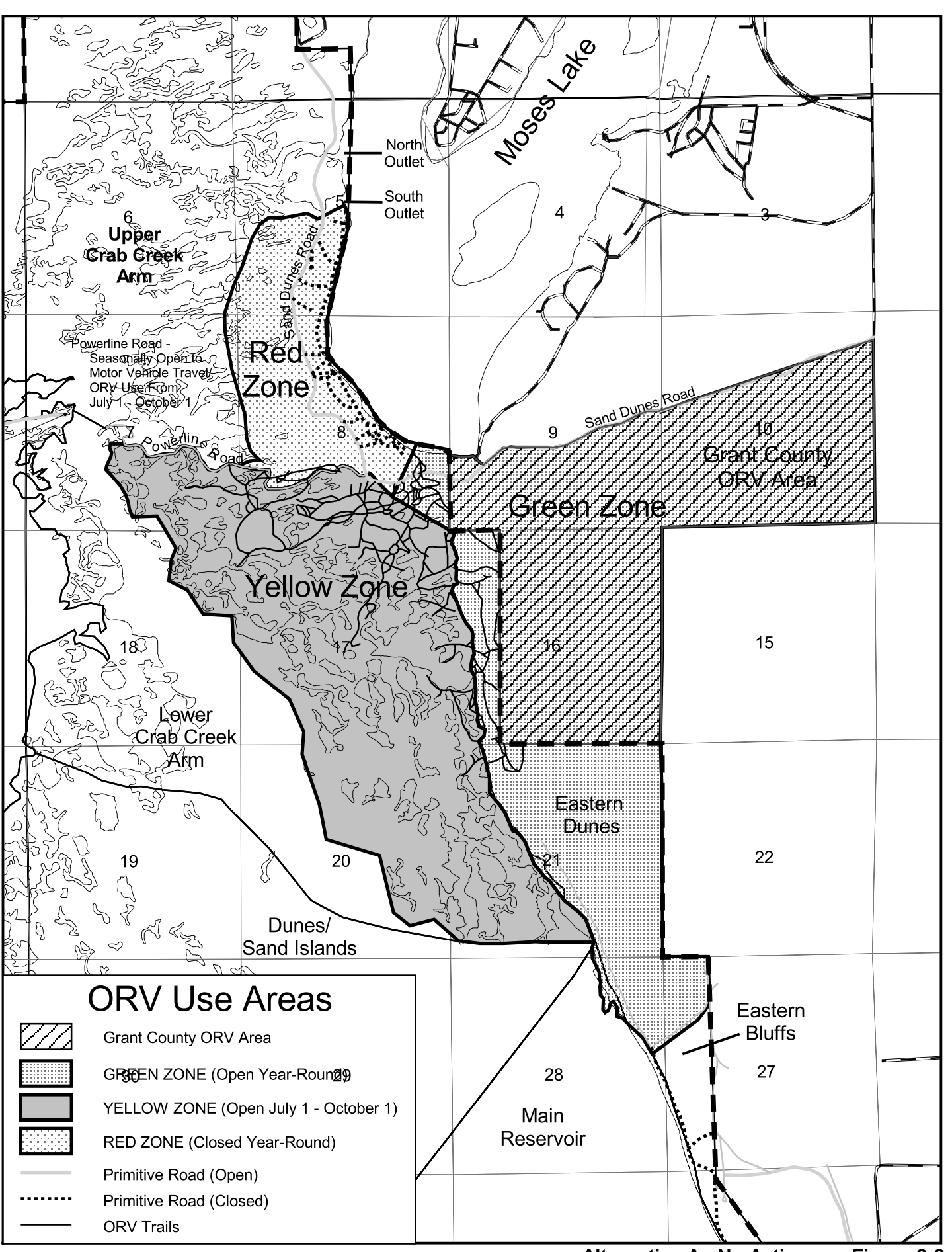
- Continue fire protection at Potholes Reservoir under the fire protection contract between the WDFW and Grant County Fire Protection Districts 4, 5 and 11.

- Prohibit houseboats in any environment at Potholes Reservoir. No houseboat is permitted in any environment under the Grant County Shorelines Management Master Program dated June 1975.

- Identify and abate unauthorized uses and trespass violations on Reclamation lands. Based on regular surveillance of lands and resources where a high probability of unauthorized uses exist (i.e., adjacent to private croplands), detect, confirm and abate, all unauthorized uses or trespass violations.

- Coordinate, to the extent practicable, Potholes Reservoir land use activities and plans with Grant County planning efforts (e.g., Comprehensive Plan and Shorelines Master Program) and ordinances.

- For all commercial activities on Reclamation lands, insure all new or renewed concession contracts issued by the State are consistent with the directives and standards outlined in the Reclamation's concessions management policy for non-federal managers (as directed in Departmental Manual LND 04-02). The State is required to receive a fair market return of revenue under this policy.



Alternative A - No Action **Figure 2-2**

R27E R28E

North Potholes Reserve

Moses Lake

Upper Crab Creek Arm

North Outlet

South Outlet

Peninsula North

Sand Dunes Road

Cartop Boat Launch

Powerline Boat Launch

Powerline Road

Sand Dunes Road

Peninsula South

Upper West Arm

Job Corps Dike Boat Launch

Lower Crab Creek Arm

Eastern Dunes

Eastern Bluffs

Dunes/Sand Islands

O'Sullivan Site - North

T18N

T17N

Winchester Wasteway

Lower West Arm

Main Reservoir

See Figure 2-2.2

Potholes State Park

Frenchman Hills Wasteway

Developed Corridor

Proposed Campground Expansion Area

Proposed Bike/Pedestrian Trail

Mar Don Resort

262

Grant County

Study Area

Washington State

Alternative A - Potholes Reservoir RMP FEIS
No Action
Figure 2-2.1

RMP Study Area
Management Areas
Grant County ORV Area
Designated Dispersed Camping Areas

Watchable Wildlife Areas
North Potholes Vehicle Route
Open Access
Restricted Access
Developed Recreation Area

Dispersed Camping Areas
Closed Year Round
Open Year Round
Seasonally Open (Closed March 15-June 30)
Designated Dispersed Camping Areas

Grazing Permit TP-01
Seasonal Grazing March 15 - April 15
Seasonal Grazing November 1 - March 15

Misc. Improvements
Dikes
Powerline
Install Vault Toilet
Provide Seasonal Toilets
Provide Courtesy Dock

Roads
Highway/Improved Roads
Primitive (Closed)
Primitive (Open)
ORV Trails
Gate

Alternative A
No Action

Potholes Reservoir
Resource Management Plan
Final Environmental Impact Statement

N

0.5 0 0.5 1 1.5 2 Miles

U.S. Department of the Interior
Bureau of Reclamation

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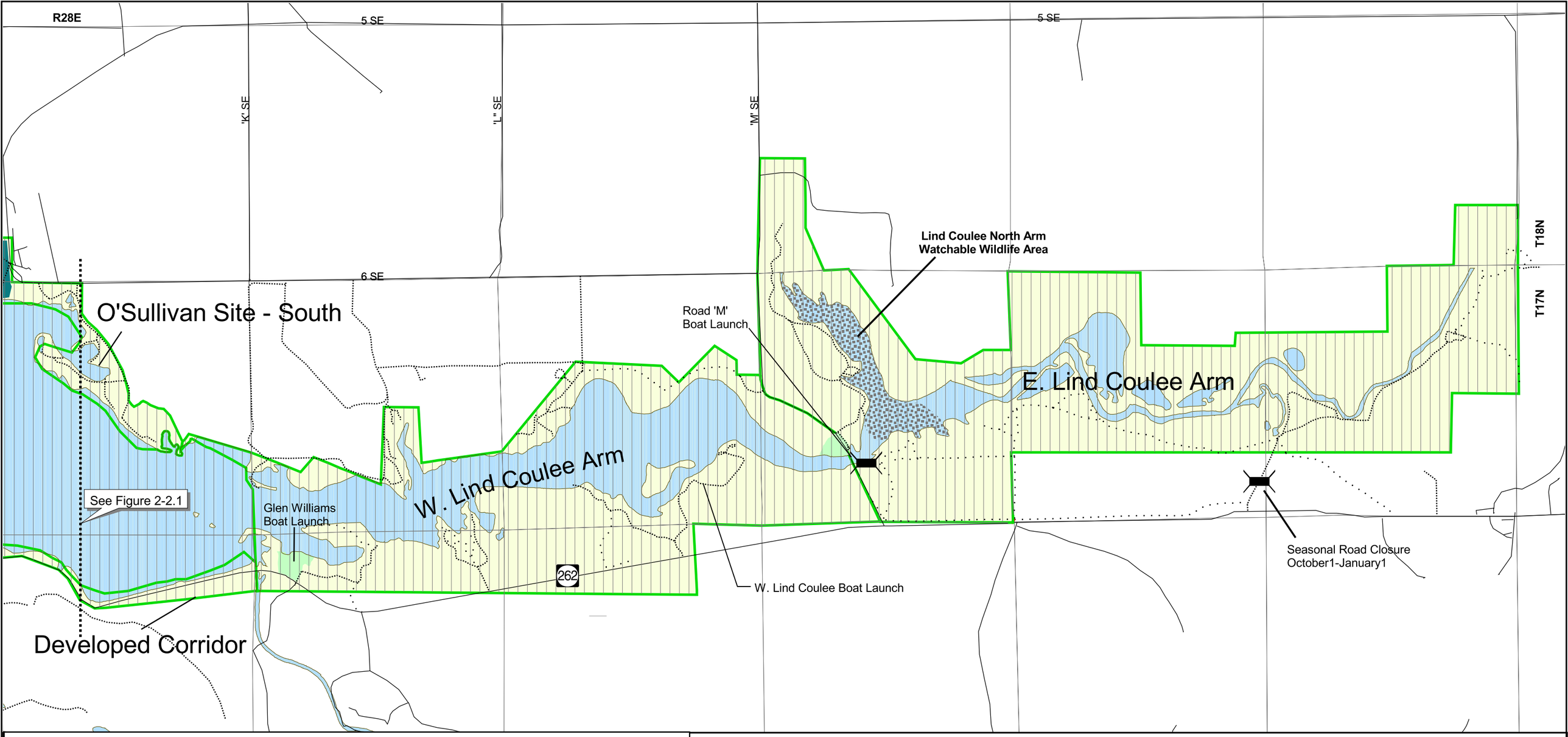

Alternative A: No Action
Potholes Reservoir Resource Management Plan FEIS

- RMP Study Area
- Management Areas
- Watchable Wildlife Areas
- Developed Recreation Area

Dispersed Camping Areas

- Open Year-Round

Roads

- Highway/Improved Roads
- Primitive (Closed)
- Primitive (Open)
- Gate

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N

Scale 1:24,000

0.5 0 0.5 Miles

Alternative A - Potholes Reservoir RMP FEIS
No Action **Figure 2-2.2**

- Limit concession contract administration by the SPRC to SPRC administered lands and on WDFW administered lands to the Reclamation.

- Amend land use agreements (MOAs) between the WDFW and SPRC to reflect current "lead agency" management and jurisdictional authorities.

- Continue discussions with the WDNR to establish guidelines for land use activities on WDNR-leased lands.

Off-Road Vehicle Management:

- Control or eliminate ORV use and/or motorized travel in environmentally sensitive areas.

- All Reclamation lands are closed to motorized travel except for those roads and areas designated "open" for such use.

Visitor Information/Interpretation:

- Develop "Watchable Wildlife" sites and interpretive trails in concert with the statewide Watchable Wildlife Program administered by the WDOT and WDFW.

- Install signs to clearly identify public access routes on Reclamation land. Post signs along major roadways to indicate key road access points.

Public Health and Safety/Environmental Protection:

- Identify and restrict access to areas that present public safety concerns.

- Control dispersed camping in environmentally sensitive areas with appropriate site improvements, access and seasonal restrictions, or site closure.

- Prior to any action which would modify the environment, the State will submit any necessary environmental reports as directed by the Reclamation. The Reclamation will be responsible for compliance with the National Environmental Policy Act. No such modification of the environment will be authorized without written approval from the Reclamation.

- Encourage volunteer efforts to accomplish resource management programs and objectives. Work with user groups, clubs, and civic organizations to promote volunteer cleanup projects and a "pack-in/pack-out" ethic.

2.5 DETAILED DESCRIPTION OF THE ALTERNATIVES

This section details the four alternatives evaluated in Chapter 4, "Environmental Consequences," and describes the specific management actions and plan elements and features included in each alternative. The comparative summary of the management actions and consequences by alternative were previously provided in Tables 2-1, 2-2, and, 2-3 (see section 2.4).

2.5.1 Alternative A - No Action

Under this alternative, current land use, recreation and resource management activities would continue under existing laws and policies, land use practices, management plans, and agreements. Specific resource management actions or activities identified by the SPRC and/or WDFW would continue to receive Reclamation review and oversight as necessary. Figures 2-1, 2-2.1 and 2-2.2 summarize future conditions and actions without a comprehensive RMP for Potholes Reservoir.

In addition to the common management actions outlined above, the Reclamation and/or the State (WDFW and SPRC) would:

Natural Resources:

- Coordinate with relevant resource personnel and adapt management strategies to avoid or minimize effects on federal or state listed threatened and/or endangered species including the Washington ground squirrel which is a species of concern.

- Review and comment on other agency actions and management plans affecting land and water resources in or adjacent to the study area.

Cultural Resources:

- Conduct Class III surveys and prepare a Cultural Resource Management Plan (CRMP). The CRMP will outline specific actions and methods to protect cultural resources.

- Coordinate with Native Americans with interests at Potholes Reservoir to prepare the CRMP and manage cultural resources.

- Obtain location-specific cultural resource clearances when agency actions, such as recreation enhancements or facility development occur; avoid adverse effects on cultural resource sites by relocating or redesigning any proposed development.

- Conduct consultations, per 36 CFR 800, to determine site eligibility, project effect, and appropriate treatment of adversely affected Register-eligible sites.

- Determine whether cultural resource sites are present on involved lands when permits and leases for grazing, agriculture, recreation, or other actions involving Reclamation lands are under consideration for issuance or for renewal. If National Register eligible or unevaluated sites are present, the Reclamation would determine if the authorized use could affect those sites. If damage could occur or is occurring, the Reclamation would work with the WDFW to consider altering the land use agreement to exclude use of the site or include conditions that would avoid or reduce damage.

- In accordance with the Native American Graves Protection and Repatriation Act (NAGPRA) initiate actions to protect or remove human burials if they are reported to be exposed or endangered by reservoir operations, natural erosion, or land use activities.

- Initiate cultural resource investigations and consultations if future developments are proposed in areas not previously surveyed. If cultural resources are present in a proposed development area, avoid disturbing the site, or, if avoidance is not possible, avoid or minimize the adverse effect(s) with appropriate management or mitigative actions. Management actions would be defined in a MOA with the Washington State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (the Advisory Council). Native Americans

with interests at Potholes Reservoir would be consulted, as appropriate, to identify, protect, or mitigate effects to sacred or traditional cultural properties.

- Implement public education programs to reduce accidental damage to or vandalism of cultural resources, and promote resource protection by the public.

Recreation: Dispersed, unstructured activities outside the Developed Corridor (e.g., Potholes State Park/Mar Don Resort) would continue to typify public recreation at Potholes Reservoir. Under the No Action Alternative, future recreational activities are expected to be managed by the Reclamation, SPRC, and/or WDFW as follows:

Recreation Sites and Improvements:

Dispersed Camping

- Continue to allow dispersed, unregulated camping in all areas except North Potholes Reserve and Potholes State Park provided that natural or cultural resources are not jeopardized. Active management of dispersed recreation sites would not occur unless monitoring indicates a need for such management in the future. A policy of "pack-in/pack-out" would continue in all dispersed (undeveloped) or primitive (minimally developed) camping areas.

Developed Recreation Areas

- Allow the future expansion of recreation facilities and services within Potholes State Park. The SPRC would be authorized to expand present sites and facilities when future public recreation demand and facility use warrant additional development.

An estimated 11-acre campground expansion area has been identified by the SPRC just west of the existing campground area (see Figure 2-2.1). The concept plan for Potholes State Park (see Figure 2-3) would provide approximately 100 individual campsites, several group campsites, and associated facility amenities and services (restrooms, showers, parking areas, pathways, and centralized trash collection) within the expansion area. Actual facility and site development is expected to occur when recreation demand exceeds existing state park facility and site capacities and sufficient capital improvement funds are available.

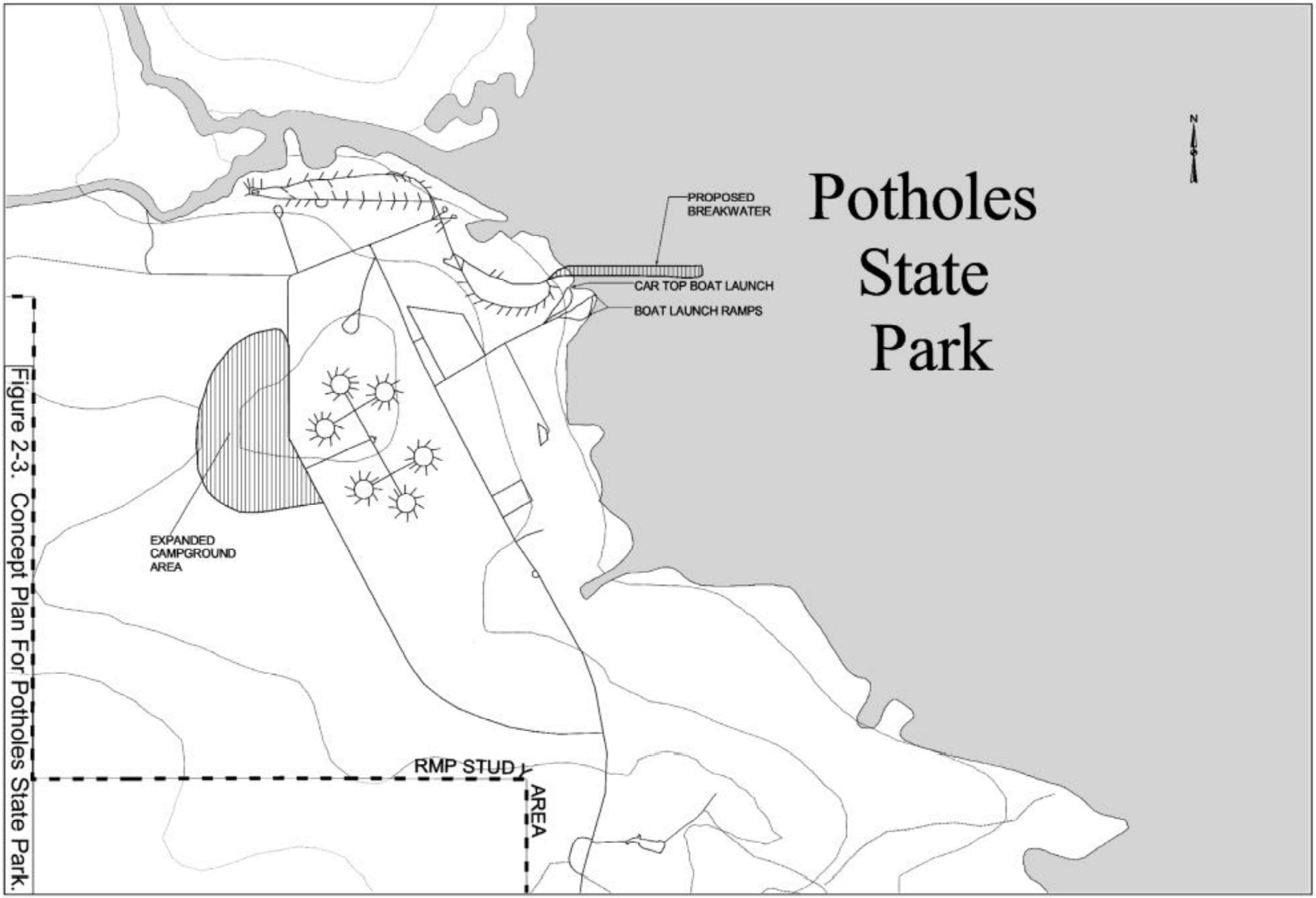


Figure 2-3. Concept Plan For Potholes State Park.

Other Recreation-Related Actions

- When new recreation sites or facilities are warranted, expansion within existing recreation areas would receive priority over new site development. Future development proposals would be based on public facility needs, recreation demand, and environmental protection requirements.

Land Use and Administration:

- Modify the land use agreement between the WDFW and Grant County to operate and maintain an ORV Area to include only those Reclamation lands located in the existing "Green" and "Yellow" zones (see Figure 2-2). Exclude those lands (approximately 105 acres) in the Eastern Bluffs management area that are currently included in the existing ORV Area lease, but situated outside the "Green Zone" boundary.

Off-Road Vehicle Management:

- Continue present ORV management practices and zone restrictions. ORV riding within the RMP study area would continue to be limited to the "Yellow" and "Green" zones located in the Lower Crab Creek Arm and Eastern Dunes management areas, respectively (see Figures 2-2 and 2-2.1). No new areas would be designated "open" nor would season-of-use changes be made.

Under existing management, the 433-acre "Red Zone" would remain "closed" to motor vehicle travel and ORV use; the 1,459-acre "Yellow Zone" and 1.7 mile Powerline Road would remain "seasonally open" from July 1 to October 1; and the 1,895-acre "Green Zone" would remain "open year-round." The Grant County ORV Area designated for ORV riding would remain unchanged and encompass Reclamation lands both inside and outside the RMP study area as well as Grant County ORV Area lands adjacent to the study area. Grant County would construct a fence between the "Yellow" and "Green" zones with 3 to 4 access gates to reduce unauthorized and indiscriminate ORV entry into the "Yellow Zone."

- Specific to ORV use, when ORV use causes substantial damage to land, soil, water, wildlife, wildlife habitat, archeological, historic or vegetative resources, affected areas and trails would be immediately closed to ORV use or appropriate controls established to prevent further deterioration of the environment (Executive Orders 11644 and 11989). No area, road or trail would be reopened

until the adverse effects have been eliminated and measures have been implemented to prevent recurrence.

If substantial resource damage is found, areas and roads currently not posted would be signed to reflect closure. Fencing and other physical barriers would not be used unless signs prove ineffective.

- Coordinate ORV management strategies with WDFW and Grant County to minimize damage or human interference to wildlife or wildlife habitat within the Grant County ORV Area.

- Limit motor vehicle access outside the Grant County ORV Area to existing roads and parking areas designated "open" for motorized use. All existing road closures would remain in effect.

Grazing Management:

- Renew the existing 7,400-acre grazing permit (TP-01) provided the lands are grazed in a manner which maintains and enhances the North Potholes Reserve shrub-steppe community. The objective of this permit is to use a light winter and early spring grazing treatment to improve the perennial bunchgrass component of the native shrub-steppe community. The Reclamation reserves the right to request WDFW termination of any permit at the end of any year if such termination is desirable to comply with other federal programs or resource needs.

- Continue to limit TP-01 grazing use to no more than 600 AUMs per season (November 1 until April 15).
- WDFW will monitor and evaluate livestock grazing in permitted use areas twice annually and modify permit conditions and Grazing Plans accordingly. No more than 40 percent of the forage produced annually will be removed under the Grazing Plan.

- WDFW reserves the right to alter and change the provisions of the Grazing Plan to include reduction in acres of pasture available and number of AUMs authorized when such changes are required to benefit fish or wildlife management, public hunting, or other recreational uses.

- WDFW reserves the right to cancel a permit in the event the area described in the permit is included in a land use plan determined to be a higher and better use.

Visitor Information/Interpretation:

- Provide managed access, turnouts, signs, brochures (e.g., "Birds of Potholes Reservoir"), and/or interpretive displays to enhance "Watchable Wildlife" viewing opportunities at the following locations (see Figures 2-2.1 and 2-2.2 for specific site locations):

– North Potholes Vehicle Route: Develop an interpretive vehicle trail utilizing the existing North Potholes gravel road system with stops at the Cartop Boat Launch, Powerline Boat Launch, Peninsula South overlooks and turnouts, and Job Corps Dike. This route would provide outstanding interpretive opportunities for viewing waterfowl, waders, shorebirds, raptors and songbirds. Species of reptiles, amphibians, furbearers and mule deer also occur in the area.

  Interpretive maps, brochures, reader boards and possibly short loop trails would be used to aid visitor understanding of the area's local ecology and wildlife diversity. The vehicle trail would also provide quality recreation and educational opportunities for senior citizens or those less able to experience the Potholes area on foot.

– Lind Coulee North Arm: Install parking lots, short trails with blinds, or, more simply, strategic parking turnouts where wildlife can be viewed from vehicles. Under either scenario, interpretive signs would be designed and installed so they can be viewed from vehicles. This area provides excellent opportunities to view migrant shorebirds and concentrations of waterfowl during late summer and early fall when mudflats become exposed.

Public Health and Safety/Environmental Protection:

- Provide "minimum basic" on-shore restroom facilities (i.e., seasonal portable toilets or permanent vault toilets) in high use areas where improper human waste disposal practices pose a public health or environmental hazard.

- Close roads (seasonally or permanently) in environmentally sensitive areas or where significant adverse environmental impacts have occurred. The Reclamation policy is to ensure that the use of motor vehicles on Reclamation lands will be controlled and directed so as to protect the land resource, promote the safety of all users, and minimize land use and user conflicts. Reclamation

lands are closed to motorized travel except for areas, roads or trails designated "open" for such use. Under existing management, approximately 17.7 miles of the gravel/primitive road network are permanently closed to motor vehicle travel and 3.2 miles are seasonally closed.

- Maintain 42.6 miles of the gravel/primitive road network open year-round or seasonally to discourage random motor vehicle travel.

- Bureau of Reclamation and the state would enter into cooperative agreements with other federal and state officials, and/or the Grant County Sheriff's Office to enforce laws and regulations applicable to the Potholes Reservoir study area. Self-regulation and voluntary compliance among recreational users would be the preferred management approach.

- Continue to prohibit motorized boats, motor vehicles, and floating devices in North Potholes Reserve. The reserve would remain open for "walk-in" and non-motorized day use activities (hunting, fishing, wildlife observation, picnicking, etc.) year-round.

- Minimum wake restrictions and other boating restrictions for the safety of boaters, swimmers, and others using the waters of Grant County would be governed by Grant County Boating Ordinance 6.08, as amended.

- Continue existing firearm discharge restrictions. Currently, the discharge of firearms is prohibited within the ORV Area except from September 1 - February 1, and no guns are allowed in North Potholes Reserve and Potholes State Park, year-round.

2.5.2 Alternative B - Preferred

The Preferred Alternative provides for future recreation development, controlled access and dispersed camping, a reduction in the acres of seasonal ORV use area, and the preservation and enhancement of natural and cultural resources. Implementation of Alternative B would facilitate greater coordination among the many agency programs, plans, and actions as they apply to Reclamation lands in the RMP study area. The plan elements featured in this alternative are summarized on Figures 2-4.1, 2-4.2 and 2-4.3 and include the following.

R27E R28E

North Potholes Reserve

North Potholes Reserve Watchable Wildlife Area

Public Access Restricted March 15-May 30

Peninsula North

West Lake/ North Outlet Watchable Wildlife Area

Upper Crab Creek Arm

Moses Lake

North Outlet

South Outlet

Dispersed Camping Areas No Improvements

Non-Motorized Access Routes

Seal Rocks Road

Cartop Boat Launch

Powerline Boat Launch

Powerline Road

Sand Dunes Road

Job Corps Dike Boat Launch

Peninsula South

Upper West Arm

Job Corps Dike Dispersed Camping Area No Improvements

Lower Crab Creek Arm

Eastern Dunes

Eastern Bluffs

Install Road Gates
No Motorized Access

Dunes/Sand Islands

O'Sullivan Site - North

Develop as Unit of Potholes State Park

Until Developed - Provide Seasonal Toilets

F king Ar
N pi
Day Use Only

See Figure 2-4.2

Winchester Wasteway

Lower West Arm

Main Reservoir

T18N

T17N

Potholes State Park

Frenchman Hills Wasteway

Proposed Campground Ex nsion Ar

Developed Corridor

Proposed Bike/Pedestrian Trail

Mar Don Resort

262

Blythe Boat Launch
Surface Cartop Boat Launch
Allow Camping

Grant County

Study Area

Washington State

Alternative B - Potholes Reservoir RMP FEIS Preferred Alternative

Figure 2-4.1

- RMP Study Area
- Management Areas
- Habitat Management Areas
- Grant County ORV Area
- ORV Use Area Open Year-Round
- ORV Use Area Closed Year-Round
- ORV Use Area Seasonally Open (July 1 - October 1)
- Minimum Wake Year-Round
- Minimum Wake April 15 - June 30
- No Motorized Watercraft
- Enhance Diking System
- X Designated Dispersed Camping Areas

Dispersed Camping Areas

- Closed Year Round
- Open Year Round
- Seasonally Open (Closed March 15-June 30)
- Designated Dispersed Camping Areas

Grazing Permit TP-01

- Seasonal Grazing March 15 - April 15
- Seasonal Grazing November 1 - March 15

Misc. Improvements

- Dikes
- Powerline
- Install Vault Toilet
- Provide Seasonal Toilets
- Provide Courtesy Dock

Roads

- Highway/Improved Roads
- Primitive (Closed)
- Primitive (Open)
- ORV Trails
- Gate

Watchable Wildlife Areas

- North Potholes Vehicle Route
- Open Access
- Restricted Access
- Developed Recreation Area

Alternative B
Preferred Alternative

Potholes Reservoir
Resource Management Plan
Final Environmental Impact Statement

N

0.5 0 0.5 1 1.5 2 Miles

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

R28E

5 SE

5 SE

'K' SE

'L" SE

'M' SE

T18N

T17N

36

31

1

6

6 SE

O'Sullivan Site - South

Dispersed Camping Area until
O'Sullivan Site - North is Developed
as Unit of Potholes State Park

#2 Dispersed Camping Area
No Improvements

Lind Coulee North Arm
Watchable Wildlife Area

Sampson's Pit
Dispersed Camping Areas

Sampson's Beach
Dispersed Camping Area

#1 Dispersed Camping Area
No Improvements

E. Lind Coulee Arm

W. Lind Coulee Arm

See Figure 2-4.1

Main Reservoir

Glen Williams
Boat Launch
Allow Camping

262

Road 'M' Boat Launch
Allow Camping

Seasonal Road Closure
October1 - January1

Developed Corridor

#5 Dispersed Camping Area
No Improvements

#3 Dispersed Camping Area
No Improvements

W. Lind Coulee Boat Launch
Dispersed Camping Area
No Improvements

#4 Dispersed Camping Area

Alternative B: Preferred Alternative

Potholes Reservoir Resource Management Plan FEIS

RMP Study Area

Management Areas

Watchable Wildlife Areas

Developed Recreation Area

Dispersed Camping Areas

Closed Year-Round
Except In Designated Areas

Designated Dispersed and Primitive Camping Areas

Misc. Improvements

Provide Seasonal Toilets

Provide Courtesy Dock

Roads

Highway/Improved Roads

Primitive (Closed)

Primitive (Open)

Gate

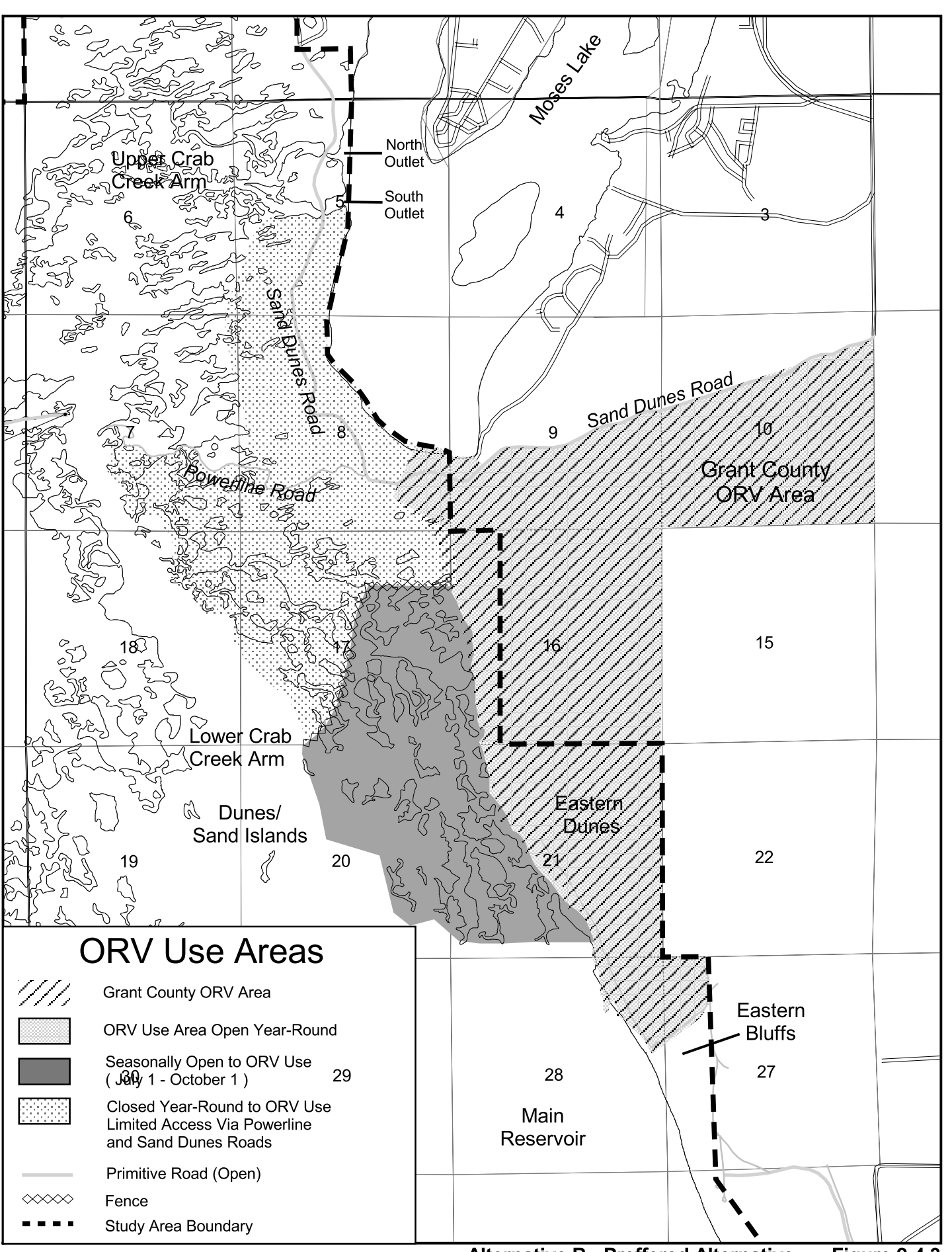
N

Scale 1:24,000

0.5 0 0.5 Miles

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

Alternative B - Potholes Reservoir RMP FEIS
Preferred Alternative **Figure 2-4.2**



Alternative B - Preffered Alternative **Figure 2-4.3**

Natural Resources: In addition to the management actions described under Alternative A, Alternative B includes additional actions to minimize and correct soil and shoreline erosion problems; restore and protect vegetation, habitat diversity, wildlife, and water quality; and enhance visual quality. Specifically, the Reclamation and/or the State (WDFW and/or SPRC) would:

Soil Conservation and Erosion Control:

- Conduct an integrated erosion inventory and control program to identify and prioritize eroded features and areas, unstable landforms, and areas susceptible to soil erosion and/or compaction. The Reclamation and the State would identify corrective measures, prioritize areas to be rehabilitated, and develop a monitoring program to assess program results.

- Implement shoreline erosion control measures with an initial emphasis on protecting cultural resources and public facilities in developed recreation areas. Specific erosion control measures would be identified on a site and project-specific basis and likely include the construction of retaining walls, the placement of rock revetments or gabions, vegetative plantings, or other such measures to halt the process of shoreline retreat.

- Limit or eliminate motorized travel or recreation activities on soils sensitive to compaction, high soil erosion potential rating, and/or exhibit existing accelerated erosion problems.

- Post signs or install barriers to close (seasonally or permanently) those portions of the primitive road system where erosion is a problem.

- Control soil and shoreline erosion and wetland and riparian habitat degradation in high use areas within the Developed Corridor by providing water access via constructed trails and boardwalks. Obliterate and restore random trails.

- Monitor and evaluate the success of soil conservation and shoreline erosion control projects. Adjust the specific methods and techniques employed when project success needs improvement.

Vegetation and Weed Control:

- Where feasible, restore and rehabilitate areas presently degraded by land use activities. Restoration efforts would initially focus on areas severely damaged by vehicular access and/or dispersed camping where such access or use would be terminated. Revegetation efforts would use plants native to the area and beneficial to wildlife and special status species. The exact plant mix and planting densities to be used would be determined by the WDFW.

- In the Lower Crab Creek Arm management area, 919 acres of the ORV "Yellow Zone" would be permanently closed to motorized travel and rehabilitation efforts initiated in severely damaged areas. The WDFW would locate and develop from one of the closed trails, an interpretive walkway to illustrate habitat restoration efforts.

- Support private initiatives and volunteer efforts to plant native species in areas identified for habitat enhancement or site rehabilitation projects.

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- Minimize the acreage of irrigated grass in Potholes State Park to maintain quality shrub-steppe habitat.

- Monitor and evaluate the success of vegetation rehabilitation and natural revegetation projects. Adjust the specific methods and techniques employed when project success needs improvement. If natives are the dominant cover type, no supplemental rehabilitation measures (e.g., plantings) would be needed.

- Allow limited use of spot herbicide applications to kill small patches of Eurasian watermilfoil affecting public boat ramps, courtesy docks and swimming areas, and to protect wildlife habitat value (e.g., maintain open water for waterfowl resting and feeding). Additionally, allow herbicide applications to kill patches of purple loosestrife that are colonizing wetlands and reducing/eliminating their suitability as wildlife habitat. Prior to herbicide use, the potential short- and long-term effects on special status species (e.g., leopard frog) would be evaluated.

- Mechanically remove by cutting salt cedar trees (*Tamarix*) before they become heavily established.

Fish and Wildlife:

- Designate the Upper West Arm and Upper Crab Creek Arm "Habitat Management Areas."

– Seasonally restrict watercraft to low speed/minimum wake operation from March 15 through June 30 to enhance wildlife nesting and breeding success for grebes, waterfowl, and other shorebirds.

– Seasonally prohibit dispersed camping from March 15 through June 30 to enhance wildlife nesting and breeding success. During this seasonal closure period, HMA dispersed camping opportunities would be available at specific sites designated and posted as "open" (see Figures 2-4.1, 2-4.2 and 2-4.3 for site locations).

- Maintain and enhance the diking system located in the North Potholes Reserve, Upper Crab Creek, and Upper West Arm management areas to increase the number and extent of "carp-free" waters suitable for special status species (e.g., leopard frogs), waterfowl, and other aquatic wildlife (e.g., grebes, terns, and herons).

- Manage these diked, "carp-free" waters either for aquatic wildlife (i.e., waterfowl) and/or as a separate fishery from the main reservoir. Those waters managed for fish would target warm water species such as bass and bluegill.

- Allow the limited use of rotenone in "carp-free" management waters. However, with the recent listing of the leopard frog as a state threatened species, the practicality and desirability of this management action must be carefully evaluated.

- Identify and protect bald eagle perching and foraging winter habitat. Although wintering bald eagles use the entire reservoir, the North Potholes Reserve, Peninsula South, and Upper Crab Creek Arm management areas are the most heavily used. In the event bald eagles pioneer into or breed in an area, stipulations would be incorporated into existing management and activity plans to ensure human disturbance is kept to a minimum. Appropriate site protective dates and/or buffer zones would be established and implemented near nesting sites.

- Post signs to seasonally close specific areas, campsites or islands during critical wildlife breeding and nesting periods. Closure periods to protect breeding sites would generally apply from February 1 to June 30 for nesting species of concern: Canada geese, ducks, and colonial nesting birds (e.g., gulls, terns, herons, egrets, and grebes).

- Enhance bald eagle wintering and roosting habitat by planting additional trees (i.e., cottonwoods and willows) where natural regeneration of suitable tree species is lacking or suitable trees are being lost or nonexistent. Measures (i.e., wrap tree trunks with wire netting) would be taken to protect key roosting sites from beaver activity.

- Seek funding to conduct a natural resource's GIS update at least every 10 years. The inventory could include an update of all the habitat, mammal and avian attributes previously mapped including such categories as waterfowl, colonial nesting birds, bald eagle perch trees and roosting sites, as well as threatened and endangered species occurrence and critical habitat locations.

- Seek funding to analyze the level of disturbance and impacts to nesting birds and other wildlife caused by motorboats, personal watercraft, and dispersed camping activities. Based on these findings, develop or modify strategies to control the time and place of these activities to reduce human-caused disturbances and protect sensitive habitat areas and vulnerable wildlife populations. These disturbance factors are particularly prevalent in the Dunes/Sand Islands management area.

- Control shoreline access and trails detrimental to wildlife habitat. Traditional fishing access would be maintained and perhaps formalized with constructed trails and/or boardwalks to prevent straying and subsequent habitat destruction.

- Seasonally restrict public access of any type in the south/central portion of North Potholes Reserve (see Figure 2-4.1) from March 15 through May 30. The purpose of this seasonal restriction is to minimize human interaction and disturbance during waterfowl and colonial nesting bird reproductive periods.

- Eliminate roads and minimize trails through wetlands, meadows, riparian, and other sensitive wildlife habitats.

- The use of pesticides and herbicides harmful to fish and/or wildlife would be prohibited in HMAs unless authorized by WDFW and Reclamation for wildlife habitat enhancement activities.

Water Quality:

- Review through the Oversight Panel the need for routine testing of fish flesh for concentrations of organic pesticides, metabolic by-products and heavy metals.

- Review through the Oversight Panel the need for an expanded reservoir water quality and sediment sampling program to determine concentrations of potential contaminants of concern (dieldrin, methoxychlor, etc.) and the effects of mosquito control spraying activities and chemicals on reservoir water quality and biota.

- Work with Grant County Mosquito Control District #1 to avoid or minimize chemical mosquito control methods in the Upper West Arm, Upper Crab Creek Arm, and North Potholes Reserve management areas. If mosquito control is deemed necessary biological control methods would be used whenever possible. In some circumstances, if biological controls fail or if human health is at risk, chemical controls would be allowed.

Visual Quality:

- Develop criteria for the appearance of structures and natural landscape preservation. These criteria would be applied in the planning, design, land use agreements and construction of all new facilities and structures, and in the maintenance or modification of all existing facilities and structures.

- Increase the promotion of "pack-in/pack-out" waste management practices in all visitor brochures, signs, educational materials, etc. developed for the Potholes area.

- Remove illegal trash dumps located in the study area. Work with user and civic groups (i.e., hunting and fishing clubs, ORV clubs, scouting clubs, etc.) to accomplish cleanup activities.

Cultural Resources: In addition to the actions described under Alternative A, the Reclamation and/or the State would:

- Seek funds for programmatic site management, test excavation of sites being damaged by on-going land use or operations, and stabilization or other management actions for affected sites that are eligible for the National Register.

- Work with Native Americans with interests at Potholes Reservoir to develop and display appropriate interpretive information on Native American use of the area and the need to preserve and protect cultural resources.

- If cultural resources are found on Reclamation lands "open" to ORV use that are eligible for the National Register, the Grant County ORV Area boundary would be adjusted to protect identified cultural resources and/or sites. Similarly, the land use agreement which authorizes the county to operate and maintain an ORV Area on The Reclamation lands managed by the WDFW would be amended to exclude culturally sensitive areas from the agreement and subsequent ORV activity.

Recreation: The Preferred Alternative provides for limited recreation development and the maintenance of existing recreation facilities and opportunities to a standard that protects the public and public investment while achieving resource protection objectives. Future developed recreation areas would be limited to Potholes State Park and O'Sullivan Site - North where a higher level of site and facility development would be provided by the SPRC.

Dispersed camping would continue to typify public recreation on lands administered by the WDFW. However, the direct and indirect environmental effects often associated with dispersed use (i.e., soil erosion and compaction, littering, improper human waste disposal, vegetative damage, wildlife disturbances, and indiscriminate motorized travel in adjacent areas) would be controlled by directing use to specific areas or sites designated "open" for dispersed use. These areas were selected due to their suitability for public use with minimal resource conflict or environmental effect.

The primary recreation features and facilities included in the Preferred Alternative are summarized on Figures 2-4.1, 2-4.2 and 2-4.3 and include:

Recreation Sites and Improvements:

Discourage/Control Use Areas

- Post signs on specific islands (see "Fish and Wildlife above") or sites identified by the WDFW as wildlife sensitive to seasonally discourage or control human use.

Dispersed Camping Areas

- Control dispersed camping by limiting and directing use to "designated" areas or sites.

Designate the following management areas as "open" for dispersed camping:

- Peninsula North
- Peninsula South
- Lower Crab Creek Arm (boat-in or non-motorized land access required)
- Lower West Arm
- Dunes/Sand Islands (Note: At the discretion of the WDFW, specific islands may be seasonally closed with signs to minimize human disturbance to nesting birds, wildlife, and/or improve vegetative restoration efforts).

Designate the following HMAs as "seasonally open" for dispersed camping. During the seasonal closure period, dispersed camping opportunities would be available at specific sites designated and signed as "open" (see Figures 2-4.1, 2-4.2 and 2-4.3 for site locations). The seasonal closure would extend from March 15 through June 30 to enhance wildlife reproductive success.

- Upper Crab Creek Arm
- Upper West Arm

Designate the following management areas as "closed" to dispersed camping and limit dispersed camping opportunities within these areas to specific sites designated and signed as "open" (see Figures 2-4.1, 2-4.2 and 2-4.3 for site locations).

- North Potholes Reserve
- O'Sullivan Site - South
- East Lind Coulee Arm
- West Lind Coulee Arm
- Developed Corridor

Designate the following management areas as "closed" to dispersed camping.

- O'Sullivan Site - North
- Eastern Dunes
- Eastern Bluffs

- Annually monitor the impacts associated with dispersed camping and recreational use. Establish baseline data and photo points to determine recreational impacts on soil, water quality, and vegetative and habitat resources. If "Limits of Acceptable Change" (LAC) monitoring reveals that impact/action thresholds have been exceeded, the WDFW and Reclamation would explore and prescribe alternative management actions for resolving the problems and revising the management direction. Opportunities for public review and comment would be provided prior to adopting and implementing any management changes affecting public use.

- Provide centrally located toilets (permanent or seasonal) to meet human waste disposal needs in high use areas (see Figures 2-4.1, 2-4.2 and 2-4.3 for site locations).

- Adopt and enforce a reservoir-wide 15-day stay limit for dispersed camping, unless posted otherwise.

Primitive Camping Areas

- No primitive camping areas would be designated or developed.

Developed Recreation Areas:

- Provide a developed recreation area at O'Sullivan Site - North as a unit of Potholes State Park (see Figure 2-4.1). Phased SPRC facilities and amenities for the site are shown on Figure 2-5, "O'Sullivan Site - North Conceptual Plan," and include:

  - boat launch, a 2-lane concrete boat ramp with courtesy docks
  - 100 space vehicles and trailer parking
  - restrooms
  - buoys for boat moorage
  - fish cleaning station, day use beach, and swimming area
  - campground (50-100 campsites, approximately 50% to include RV utility hookups)
  - group campground
  - day use picnic area (includes parking and restroom facility)
  - non-motorized trail system including ADA accessible fishing turnouts
  - access road upgrades
  - centralized trash receptacles and collection

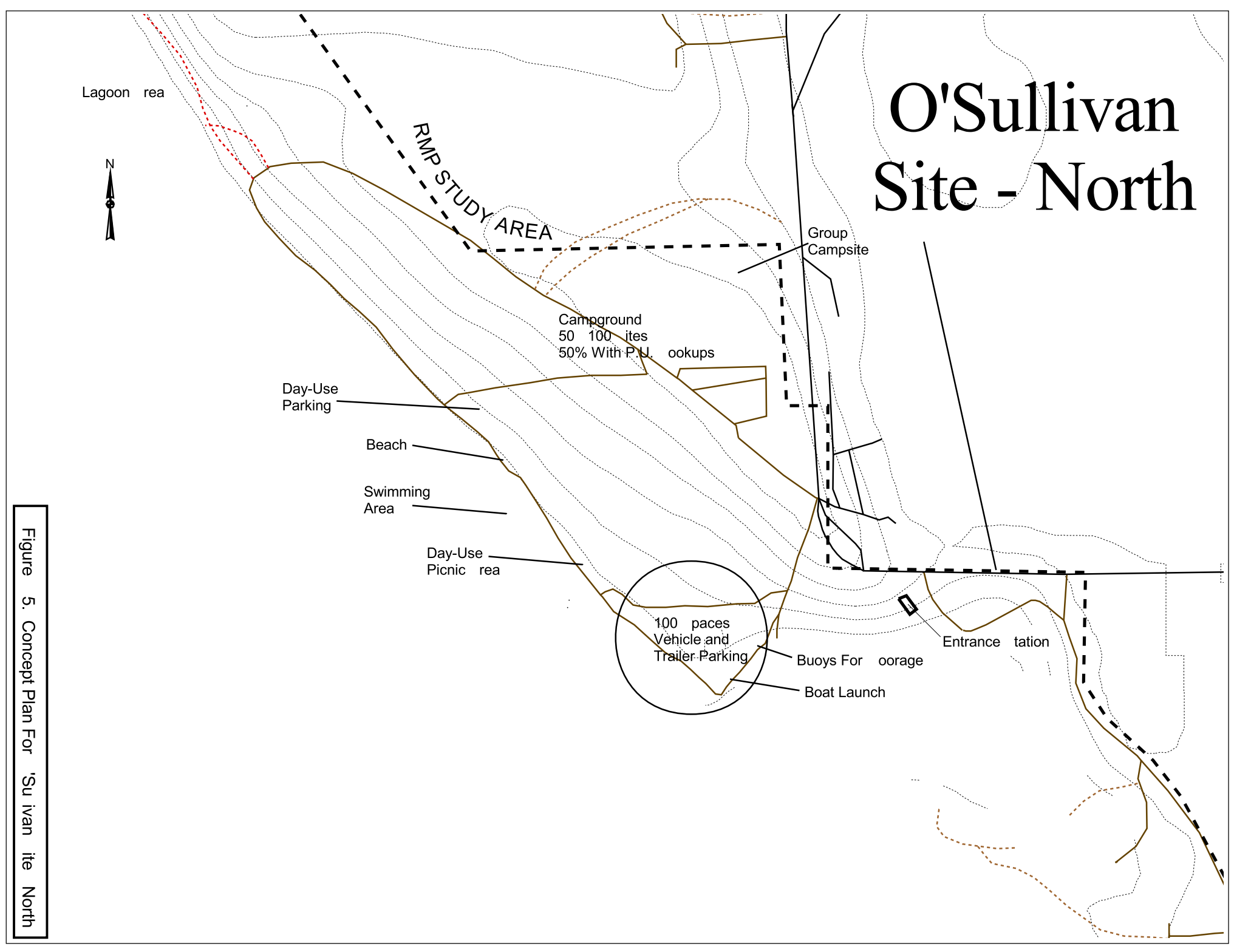

Figure 5. Concept Plan For 'Su ivan ite North

  - sewage treatment lagoons
  - entrance station
  - park residence and maintenance shop

- Provide for the construction of additional campsites and associated facilities within Potholes State Park. As described under the No Action alternative, Figure 2-3 illustrates the location and conceptual plan envisioned.

Other Recreation-Related Actions: Alternative B includes the following related actions.

- Develop additional interpretive trails and overview sites to expand "Watchable Wildlife" opportunities (see "Visitor Information/Interpretation" below for the specific features proposed).

- Provide courtesy docks at the Glen Williams Boat Launch.

- Surface the informal (cartop) boat launch at Blythe.

- Assess the feasibility of modifying and reconstructing the main boat launch at Blythe to improve low water access.

- Provide for the periodic dredging and removal of sediments deposited at the base of public boat launches.

- Provide signs directing visitors to all developed recreation areas and "designated" dispersed camping areas and sites at key road intersections; illustrate primary access routes on public information maps and in visitor brochures.

- Install "No Parking/No Camping" signs in immediate vicinity of the Powerline Boat Launch to improve vehicle and trailer maneuverability and traffic flows. Currently, dispersed parking and/or camping in close proximity to the boat ramp hampers boat ramp operations.

- Install a permanent vault toilet at the Powerline Boat Launch.

- Designate and keep the eastern portion (about one mile) of Powerline Road "open seasonally" to motor vehicle travel/ORV use.

- Until O'Sullivan Site - North is formally developed by the SPRC as a unit of Potholes State Park (see "Developed Recreation Areas" above for specific details), the O'Sullivan Beach and Perch Point area would be managed for day use recreation only (i.e., fishing, hiking, picnicking, wildlife observation, etc.). A fenced parking area with walk-in access portals would be provided off Perch Point Road, and human sanitation needs would be met via portable toilets on a seasonal basis. Trash would be managed under a "pack-in/pack-out" policy or with centrally located trash receptacles at the discretion of the SPRC. During this interim period, dispersed camping opportunities would remain available at O'Sullivan Site - South (see Figure 2-4.2) under WDFW management.

Land Use and Administration:

- Modify the land use agreement between the WDFW and Grant County to operate and maintain an ORV Area to include only those Reclamation lands within the Eastern Dunes management area, the southern portion of the Lower Crab Creek Arm and the south half of T18N, R28E, S10.

Off-Road Vehicle Management:

- Limit ORV use within the RMP study area to the Eastern Dunes and the southern portion of the Lower Crab Creek Arm management areas.

- Modify the Grant County ORV Area boundary to include the Eastern Dunes management area the southern portion of the Lower Crab Creek Arm, 320 acres of Reclamation land outside the RMP study area (T18N, R28E, S10, S1/2), and Grant County ORV Area lands. The "Green Zone" land area "open year-round" to ORV riding would continue to encompass about 1,895 acres (see Figures 2-4.1, and 2-4.3).
- Close 919-acres of the Lower Crab Creek Arm management area ("Yellow Zone") to motor vehicle travel and ORV use year-round. Maintain as seasonally open for ORV riding from July 1 to October 1 the remaining 540 acres. The 540 acre area would be fenced and posted. Motor vehicle access and travel would be allowed for maintenance, administrative, or emergency purposes.

- Designate and keep the eastern portion (about 1 mile) of Powerline Road "seasonally open" to motor vehicle travel/ORV use unless future closure or other control measures are needed to achieve resource management objectives. The western portion (about 0.7 miles) of Powerline Road would be permanently closed to motorized travel/ORV use.

- Retain the existing year-round ORV closure in the Upper Crab Creek Arm management area.

- Eliminate the northern portion of the "Yellow Zone" and all of the "Red" zone delineations and designations as both would be permanently closed to ORV travel (see Figure 2-2).

- Continue the ORV and motor vehicle closure within the Eastern Bluffs management area. Road gates or other physical barriers and signs would be installed across the two access roads that enter the site from the east (see Figure 2-4.1). No permanent ORV access route leading from the Eastern Dunes management area to the O'Sullivan Site would be constructed.

- Cooperate with the Grant County Sheriff's Office to patrol and monitor ORV use and environmental resource conditions and trends within the Grant County ORV Area.

- Restore and revegetate severely damaged areas closed to ORV use. Locate and develop an interpretive trail to illustrate habitat restoration in the Lower Crab Creek Arm management area.

- Fence the east side of Sand Dunes Road between South Outlet and Powerline Road to prevent indiscriminate ORV entry. Provide four hard-surfaced roadside turnouts along the east side of the Sand Dunes Road for vehicle and ORV parking. At each turnout, a non-motorized access route would lead to a designated dispersed camping area adjacent to Moses Lake (see Figures 2-4.1 and 2-4.3). Motorized use of these access routes would be limited to administrative and emergency use only.

- Update and post additional signs along Sand Dunes Road to improve public awareness of ORV Area boundaries, regulations, and riding and camping opportunities.

- Update existing Grant County ORV Area signs and maps to clearly illustrate ORV Area boundaries, regulations, and riding opportunities.

Grazing Management

- Limit the grazing permit program at Potholes Reservoir to the existing 7,400-acre authorization under grazing permit TP-01 or when livestock grazing is used on a rotational bases to meet management objectives (see Figure 2-4.1).

- Keep livestock forage utilization on the 6,700-acre pasture within the North Potholes Reserve and Peninsula North management areas limited to no more than 600 AUMs from November 1 until March 15.

- Keep livestock forage utilization on the 700-acre pasture within the Upper West Arm management area limited to no more than 600 AUMs from March 15 to April 15. This portion of grazing permit TP-01 is fenced and grazed as part of a two-pasture grazing rotation.

- Adjust livestock grazing management as needed to maintain or enhance habitat for special status plant and animal species. This may include development of livestock enclosures, or restricted use pastures where grazing systems cannot otherwise be adjusted to accommodate the habitat requirements of a special status species.

- Modify AUM allocations, season-of-use authorizations, and other Grazing Plan stipulations included in renewed permits to maintain or improve native rangeland species and attain composition, density, foliar cover, and vigor appropriate to site potential and wildlife management objectives.

- Modify renewed grazing permits to stipulate a minimum of two growing seasons rest from livestock grazing following fires. Following this two-year rest period, evaluate range health and suitability for livestock use prior to allowing forage utilization.

- Monitor and evaluate twice annually the effect of the grazing permit on native rangeland species, plant composition, density, foliar cover, and vigor appropriate to site potential and wildlife management objectives. The evaluator would observe growing season conditions, measure grazing use, record range condition, and determine if objectives are being met. Modify Grazing Plan season-of-use and AUM allocations accordingly or when it would benefit management objectives.

Visitor Information and Interpretation

- Provide managed access, turnouts, signs, and/or interpretive trails and displays to enhance "Watchable Wildlife" viewing opportunities. In addition to the features outlined under Alternative A, the Preferred Alternative would provide the following (see Figures 2-4.1, 2-4.2 and 2.4.3 for site locations):

  - West Lake/North Outlet: Develop a half-mile loop trail beginning at the North Outlet parking lot. The trail would traverse through shrub-steppe, wetland, and riparian habitats. Wetland crossings would likely involve boardwalk construction.

    Interpretive materials and signs would be used to describe habitat relationships for waterfowl, shorebirds, waders, songbirds and fur-bearers. The site would be convenient to Moses Lake residents and provide valuable recreation and education opportunities for tourists, local citizens, and school districts.

  - North Potholes Reserve: Design and develop a system of hiking trails and blinds north of Job Corps Dike to view and interpret the area's colonial nesting bird rookery for great blue herons, black-crowned night herons, great egrets, and double-crested cormorants. The project would also provide excellent opportunities to view shorebirds, raptors, waterfowl, songbirds, terns, beaver and mule deer.

- Develop a public education and interpretive program to increase the public's awareness of Potholes Reservoir natural resources, management problems and concerns, and the area's high desert environment and fragility. The interpretive program envisioned would focus on the areas' vegetation, wildlife, sand dune, and historian cultural features.

- Install signs at all developed recreation areas, boat launches, and other high public use areas. Use signs, maps, and brochures to inform visitors of recreation opportunities; boating hazards; boating, camping, and motorized and ORV travel regulations and restrictions; road and area closures; etc. in the reservoir area.

- Post or modify existing signs to inform the public of relevant Grant County ordinances and regulations. Post "Pack-In/Pack-Out" signs and posters on all signs and bulletin boards used for public information purposes.

- Post management regulations at “D.5 SE Road" entrance.

- Provide signs to all developed and dispersed recreation areas at key road intersections, and use informational materials and maps to illustrate these primary public access routes.

- Develop an overall visitor guide/map for the Potholes Reservoir area. The guide would be a useful tool to promote and direct visitors to designated dispersed camping areas, developed recreation area facilities and services, points of interest, etc. Provide information on motorized travel restrictions and regulations; and guidance on the proper disposal of human wastes, pack-in/pack-out, fire use, and camping etiquette.

- Pursue the cooperative development of an “Environmental Education Center” within or near the Developed Corridor.

- Install additional “ORV Area” signs to clearly direct off-road vehicle users to the authorized Grant County ORV Area. Modify the existing ORV signs posted in and near the Area to accurately reflect ORV Area boundaries and the land area “open” to ORV riding.

Public Health and Safety/Environmental Protection

In addition to, or in place of, the actions outlined under Alternative A, the following management actions would be implemented:

No Motorized Access:

- Close the western portion (about 0.7 miles) of Powerline Road and 919 acres of the “Yellow Zone” to motor vehicle travel/ORV use except for maintenance, administrative and emergency purposes (see Figures 2-4.1 and 2-4.3). Under the Preferred Alternative, approximately 18.4 miles of primitive road would be permanently closed to motorized travel.

- Install road gates, fencing, signs, and/or buoys as needed to enforce seasonal and permanent closures.

Managed/Limited Motorized Access:

- Maintain 41.9 miles of the primitive/gravel road network open year-round or seasonally to discourage random motor vehicle travel.

- Seasonally restrict motorized water craft to low-speed/minimum wake operation in the Upper West Arm and Upper Crab Creek Arm HMAs from March 15 through June 30. This action is designed to enhance wildlife nesting and breeding success for grebes, waterfowl, and other shorebirds.

- Continue the 1.5-mile seasonal road closure from October 1- January 1 in the East Lind Coulee Arm.

Resource Protection and Enhancement:

- Provide permanent or portable toilets in high use dispersed camping areas where human wastes pose a public health or environmental hazard (see Figure 2-4.1, 2-4.2 and 2-4.3 for site locations).

- Increase the public's awareness of WDFW's "pack-in/pack-out" policy and other waste management strategies. Post "pack-in/pack-out" signs at all high public use areas, dispersed camping areas, boat launches, etc.

- Seek funding and partnerships for additional staff, equipment, and/or contract services to meet reservoir-wide waste management needs toilets and trash cleanup.

- Construct trails and boardwalks to control public access and foot traffic through wetland and riparian habitats in high use recreation areas (i.e., within the Developed Corridor).

- Control dispersed camping in environmentally unsuitable or sensitive areas through appropriate access restrictions, seasonal use restrictions, or closure. Manage this use according to the "Recreation" actions described above.

- Seasonally restrict public access of any type in the south/central portion of North Potholes Reserve (see Figure 2-4.1) from March 15 through May 30. The purpose of this seasonal restriction is to minimize human interaction and disturbance during waterfowl and colonial nesting bird reproductive periods.

- Seasonally restrict watercraft to low speed/minimum wake operation and prohibit dispersed camping (except in designated areas or sites) in HMAs from March 15 through June 30 to enhance wildlife nesting and breeding success.

- Monitor resource effects from motorized access, dispersed recreation and camping, and public use on an annual basis. If the LAC process and monitoring reveals that impacts and action thresholds have been exceeded, the WDFW, SPRC, and Reclamation would explore and prescribe alternative management actions for resolving the problems and revising the management direction.

On the basis of the information gathered, the management agencies would amend or rescind existing management strategies or actions to balance public recreation and resource protection policies, goals and objectives. Opportunities for public review and comment would be provided prior to adopting and implementing any management changes affecting public use.

- Manage/limit dispersed camping and/or public access with gates, fencing, signs and/or buoys as needed to seasonally or permanently close roads and/or areas to motorized travel where resource protection and enhancement needs have been identified.

- Perform minor road improvements (i.e., grading and/or the placement of gravel) as needed to improve vehicular access and/or reduce soil erosion and public safety concerns where continued primitive road access is desirable.

- Prohibit the discharge of firearms in areas of wildlife species conflicts or for reasons of public safety in the Lind Coulee Arm, watchable wildlife areas, and other high use public recreation areas except during the primary hunting season.

2.5.3 Alternative C - Preservation/Enhancement

Alternative C, the preservation and enhancement alternative, seeks to preserve and enhance the area's natural, recreational and cultural resource attributes by focusing and restricting recreation and other land use activities to minimize adverse resource effects. In concert with this management theme, this alternative would designate four Habitat Management Areas, minimize future recreation development, and close all Reclamation lands within the RMP study area boundary to ORV riding.

This alternative would specifically exclude state park development at O'Sullivan Site - North, water milfoil control, and a continued grazing permit program. In the absence of developing O'Sullivan Site - North as an addition to Potholes State Park, the O'Sullivan Site (North and South) would be transferred from the SPRC to WDFW and managed as a day-use and dispersed camping area.

Figures 2-6.1, 2-6.2 and 2-6.3 highlight the specific management actions and plan features included in Alternative C. In order to minimize duplication and clearly define the differences between alternatives, the following discussion focuses on which actions and elements either differ from the Preferred Alternative or were eliminated because of the alternative's resource preservation and enhancement emphasis. Similar to B, Alternative C would facilitate greater coordination among the many agency programs, plans, and actions as they apply to Reclamation lands at Potholes Reservoir.

Natural Resources: This alternative includes all the actions and plan elements outlined under the Preferred Alternative. The elements listed below are either in addition to or differ in degree, size, or intensity from the Preferred Alternative.

Vegetation and Weed Control:

- Prohibit the use of spot herbicide applications to control Eurasian watermilfoil.
- Cancel grazing permit TP-01.

- Close and revegetate 3.5 miles of the primitive road system to enhance shrub-steppe habitats in the Upper Crab Creek Arm and East and West Lind Coulee Arm management areas (Figures 2-6.1, 2-6.2 and 2-6.3).

- Revegetate 4.3 miles of the primitive road system in the North Potholes Reserve, Upper West Arm, and West Lind Coulee Arm management areas previously closed to motorized use by the WDFW. Portions of the East Lind Coulee Arm road network already closed to motorized travel have naturally been recolonized with native species and requires no additional management attention.

Fish and Wildlife:

- Designate the Upper West Arm, Upper Crab Creek Arm, Peninsula South, and East Lind Coulee Arm as HMAs.

- Prohibit motorized watercraft in the Upper West Arm and East Lind Coulee Arm.

- Restrict watercraft to low speed/minimum wake operation in the Upper Crab Creek Arm year-round.

- Limit dispersed camping opportunities to specific sites designated and posted as "open" (see Figures 2-6.1, 2-6.2 and 2-6.3 for site locations).

- Continue existing road and motor vehicle closures within the Upper West Arm and limit motor vehicle travel in the Upper Crab Creek Arm, East Lind Coulee Arm, and Peninsula South to existing graveled roads.

• Seasonally restrict watercraft to low-speed/minimum wake operation in the Dunes/Sand Islands management area from April 15 through June 30 to enhance wildlife nesting and breeding success for grebes and colonial nesting birds.

Water Quality:

• Work with Grant County Mosquito Control District #1 to avoid or minimize mosquito spraying activities in the Upper West Arm, Upper Crab Creek Arm, Peninsula South, East Lind Coulee Arm, and North Potholes Reservoir management areas. If mosquito control is determined necessary, BTI or similar biological control methods would be used.

Cultural Resources: Includes all the actions and plan elements outlined under Alternative B. However, adjustments to the ORV Area boundary and associated land use agreement to exclude culturally sensitive areas from ORV use would not be required. Under Alternative C, all Reclamation lands within the RMP study area boundary would be closed to ORV use.

Recreation: With an emphasis on the maintenance of existing recreation facilities and the protection of natural resources, few, if any, new recreation amenities or developments would be constructed. Based on the recreation assessment, facilities and use would be focused within existing developed recreation areas and designated dispersed camping areas. The dispersed camping areas selected were identified in the assessment as the most popular and environmentally suited for this activity.

Overall, future recreation developments would be limited to meeting public facility needs within Potholes State Park and basic environmental protection, public health and safety needs in popular dispersed use areas. Unlike Alternatives A, B or D, no developed recreation area would be

R27E R28E

T18N

T17N

North Potholes Reserve

West Lake/
North Outlet
Watchable
Wildlife Area

Public Access Restricted
March 15-May 30

Peninsula
North

Upper
Crab Creek
Arm

No Motorized
Access Routes

Moses Lake

North Outlet

South Outlet

Dispersed
Camping Areas
No Improvements

Day Use Only
No Camping

Sand Dunes Road

Cartop
Boat Launch

Powerline
Boat Launch

Powerline Road

Job Corps Dike
Boat Launch

Job Corps Dike
Dispersed Camping Area
No Improvements

Upper
West
Arm

Peninsula
South

Lower
Crab Creek
Arm

Dispersed
Camping Area
No Improvements

Eastern
Dunes
No Motorized
Access

Eastern Bluffs
Install Road Gates
No Motorized Access

Dunes/Sand Islands

Winchester Wasteway

Lower
West Arm

O'Sullivan Site - North
Dispersed Camping Area

See Figure 2-6.2

Main Reservoir

Potholes
State Park

Frenchman Hills Wasteway

Proposed Campground
Expansion Area

Developed Corridor

Proposed Bike/Pedestrian Trail

Mar Don Resort

Blythe Boat Launch
Allow Camping

Grant County

Study Area

Washington State

RMP Study Area
Management Areas
Habitat Management Areas
Grant County ORV Area
Minimum Wake Year-Round
Minimum Wake April 15 - June 30
No Motorized Watercraft
Enhance Diking System

Watchable Wildlife Areas
North Potholes Vehicle Route
Open Access
Restricted Access
Developed Recreation Area

Dispersed Camping Areas
Closed Year Round
Open Year Round
Seasonally Open (Closed March 15-June 30)
Designated Dispersed Camping Areas

Grazing Permit TP-01
Seasonal Grazing March 15 - April 15
Seasonal Grazing November 1 - March 15

Misc. Improvements
Dikes
Powerline
Install Vault Toilet
Provide Seasonal Toilets
Provide Courtesy Dock

Roads
Highway/Improved Roads
Primitive (Closed)
Primitive (Open)
ORV Trails
Gate

Alternative C
Preservation/Enhancement

Potholes Reservoir
Resource Management Plan
Final Environmental Impact Statement

N

0.5 0 0.5 1 1.5 2 Miles

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Alternative C - Potholes Reservoir RMP FEIS
Preservation/Enhancement
Figure 2-6.1

R28E

5 SE

5 SE

'K' SE

'L" SE

'M' SE

T18N

T17N

36

31

1

6

O'Sullivan Site - South

Dispersed Camping Area
No Improvements

Sampson's Pit
Dispersed Camping Areas

Sampson's Beach
Dispersed Camping Area

#1 No Camping

#2 No Camping

Lind Coulee North Arm
Watchable Wildlife Area

E. Lind Coulee Arm

W. Lind Coulee Arm

Main Reservoir

See Figure 2-6.1

Glen Williams
Boat Launch
Allow Camping

262

Developed Corridor

#5 Day Use Only

#3 Dispersed Camping Area
No Improvements

#4 Dispersed Camping Area

W. Lind Coulee Boat Launch
Dispersed Camping Area
No Improvements

Road 'M' Boat Launch
Allow Camping

Seasonal Road Closure
October1-January1

Alternative C: Preservation/Enhancement
Potholes Reservoir Resource Management Plan FEIS

RMP Study Area

Management Areas

Habitat Management Areas

Watchable Wildlife Areas

Developed Recreation Area

Dispersed Camping Areas

Closed Year Round

Open Year Round

Seasonally Open (Closed March 15-June 30)

Designated Dispersed and Primitive Camping Areas

Roads

Highway/Improved Roads

Primitive (Closed)

Primitive (Open)

Gate

Misc. Improvements

Provide Seasonal Toilets

Install Vault Toilet

Provide Courtesy Dock

Powerline

N

Scale 1:24,000

0.5 0 0.5 Miles

Grant County

Study Area

Washington State

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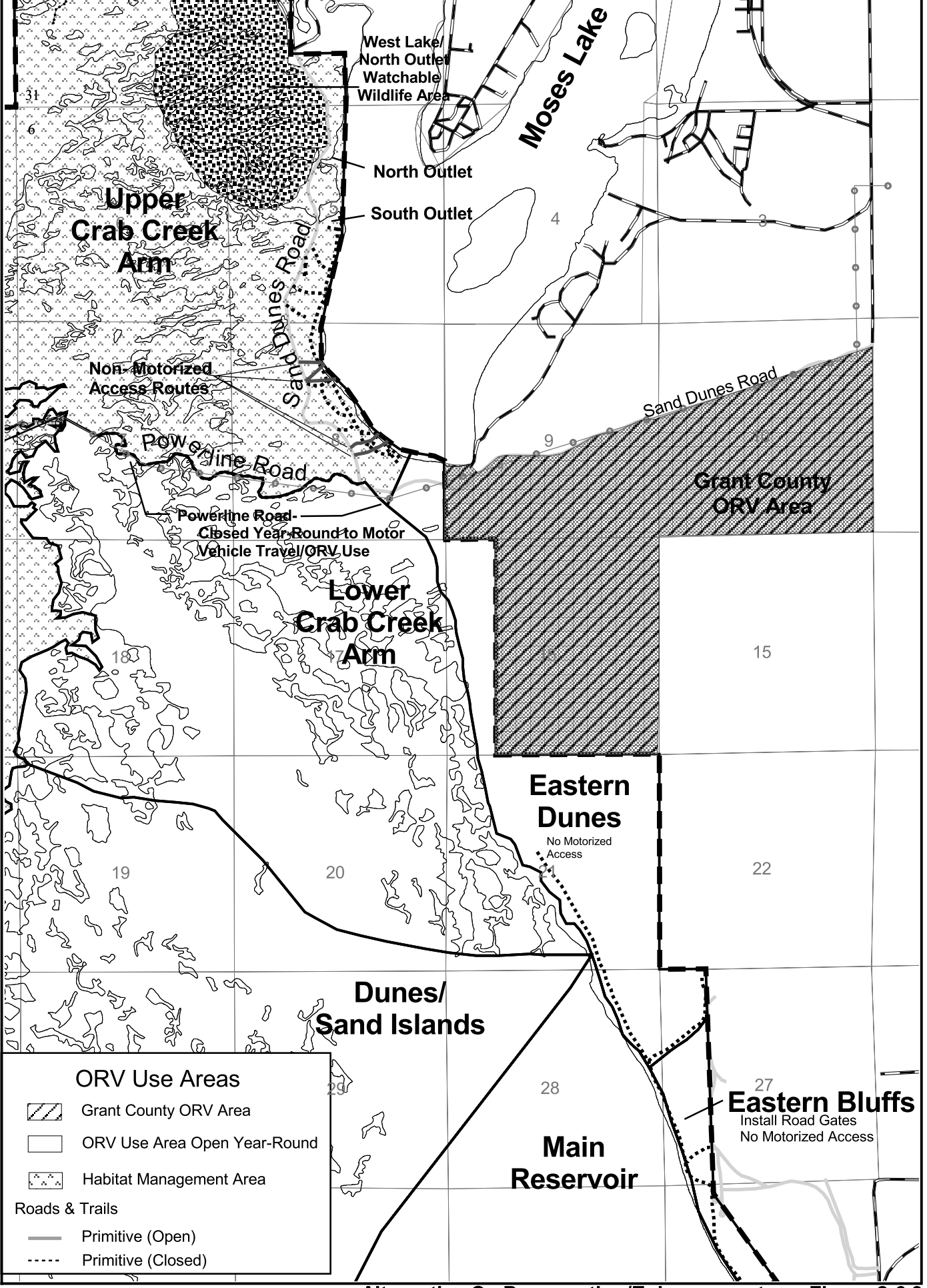
Alternative C - Potholes Reservoir RMP FEIS
Preservation/Enhancement Figure 2-6.2



Alternative C - Preservation/Enhancement Figure 2-6.3

constructed at O'Sullivan Site - North as a unit of Potholes State Park, and dispersed camping and motorized access would be more restricted compared to the other alternatives. The primary recreation features and actions included in this alternative are summarized on Figures 2-6.1, 2-6.2 and 2-6.3 and include the following:

Recreation Sites and Improvements:

Discourage/Control Use Areas would be the same as Alternative B.

Dispersed Camping Areas

- Control dispersed camping by limiting and directing use to "designated" areas or sites.

Designate the following management areas as "open" for dispersed camping:

- Peninsula North
- Lower Crab Creek Arm (boat-in or non-motorized land access required)
- O'Sullivan Site (North and South)
- Lower West Arm
- Dunes/Sand Islands (Note: At the discretion of the WDFW, specific islands may be seasonally closed with signs to minimize human disturbance to nesting birds, wildlife, and/or improve vegetative restoration efforts).

Designate the following management areas as "closed" to dispersed camping and limit dispersed camping opportunities within these areas to specific sites designated and signed as "open" (see Figures 2-6.1, 2-6.2 and 2-6.3 for specific site locations).

- North Potholes Reserve
- Upper Crab Creek Arm
- Peninsula South
- West Lind Coulee Arm
- Developed Corridor

Designate the following management areas as "closed" to dispersed camping.

- Upper West Arm
- Eastern Dunes

- Eastern Bluffs
- East Lind Coulee Arm

- Adopt and enforce a reservoir-wide 10-day stay limit for dispersed camping, unless posted otherwise.

Primitive Camping Areas:

- No primitive camping areas would be designated or developed.

Developed Recreation Areas:

- No developed recreation area would be constructed at the O'Sullivan Site. Instead, the area (North and South) would be transferred to the WDFW and managed for dispersed camping and day use. Two permanent vault toilets would be centrally located in the O'Sullivan Beach area.

Other Recreation-Related Actions:

Under Alternative C, two recreation features included in the Preferred Alternative were eliminated: (1) surface the informal (cartop) boat launch at Blythe, and (2) determine the feasibility of modifying and reconstructing the main boat launch at Blythe to provide for low water access. Other differences include:

- Limit the periodic dredging and removal of sediments deposited at the base of public boat launches to the Developed Corridor.

Land Use and Administration:

- Modify the existing land use agreement between the WDFW and Grant County to operate and maintain an ORV Area on Reclamation land to include only the 320-acre tract located outside the study area in the south half of Section 10, T18N, R28E (see Figure 2-6.3). Under this alternative, ORV use and travel would be prohibited on all Reclamation lands located within the RMP study area boundary.

- Transfer "lead agency" recreation management responsibilities at the O'Sullivan Site (North and South) from SPRC to WDFW. In the absence of developing the site as a unit of Potholes State Park, the SPRC would no longer have an interest in retaining and managing the area for recreation.

- Phase-out the grazing permit program administered by the WDFW. The existing permit program at Potholes Reservoir would be phased-out by allowing the existing permit (TP-01) to expire without renewal (see Figure 2-6.1 for permit location).

Off-Road Vehicle Management: Under Alternative C, ORV riding opportunities would be discontinued on Reclamation lands within the study area. The management actions which differ from those outlined under the Preferred Alternative include:

- Designate as "closed" to ORV use all areas, roads and trails located on Reclamation land within the RMP study area boundary.

- Modify the Grant County ORV Area boundary to include 320 acres of Reclamation land located outside the study area in the south half of Section 10, T18N, R28E and Grant County ORV Area lands. The "Green Zone" land area "open year-round" to ORV riding would encompass about 1,227 acres (see Figures 2-6.1 and 2-6.3).

- Fence the ORV Area boundary to prevent indiscriminate ORV entry from the Grant County ORV Area onto Reclamation lands within the RMP study area.

- Eliminate the existing "Yellow," "Red" and "Green" zone delineations and designations on Reclamation lands within the RMP study area since these lands would be permanently closed to motor vehicle travel and ORV riding. Motor vehicle access and travel would be allowed for maintenance, administrative and emergency purposes.

- Permanently close the 1.7 mile Powerline Road to motor vehicle travel/ORV use. Motor vehicle access would be allowed for maintenance, administrative and emergency purposes.

- Fence and provide turnouts along the east side of Sand Dunes Road between South Outlet and Powerline Road. At each turnout, a non-motorized access route would provide public access for day use activities only (e.g., fishing, hiking, picnicking, sunbathing, wildlife observation) along the west shore of Moses Lake (see Figures 2-6.1 and 2-6.3). No dispersed camping areas would be provided since the area would be managed for day use only.

Grazing Management

- Phase-out WDFW's grazing permit program by allowing the existing permit (TP-01) to expire without renewal.

- Construct fences, where needed, to prevent trespass livestock entry onto Reclamation lands from adjacent lands.

Visitor Information and Interpretation:

Includes all the actions and plan elements outlined under Alternatives A and B except for the following "Watchable Wildlife" modification.

- Lind Coulee North Arm: Provide a short (about ½-3/4 mile) interpretive trail with blinds and interpretive signs. The walk-in trail would begin at a fenced parking area just north of the Road "M" SE bridge. The trail would primarily utilize the area's existing primitive road system which would be permanently closed to motorized use and rehabilitated under this alternative. This area provides excellent opportunities to view migrant shorebirds and concentrations of waterfowl during late summer and early fall when mudflats become exposed.

Public Health and Safety/Environmental Protection:

In place of the actions outlined under Alternatives A and B, the following management actions would be implemented:

No Motorized Access - Under Alternative C, approximately 24.5 miles of primitive road would be closed to motor vehicle travel. Compared to Alternative A, the following additional closures would be made.

- Close and revegetate 3.5 miles of primitive road to motorized travel not needed for public or agency access (see Figures 2-6.1 and 2-6.2).

- Close 1.6 miles of primitive road in the south portion of the Eastern Dunes management area and the 1.7-mile Powerline Road to motor vehicle travel (see Figures 2-6.1 and 2-6.3).

- Prohibit motor vehicle travel in the Lower Crab Creek Arm, Eastern Dunes, Eastern Bluffs, Lower West Arm, Upper West Arm, and North Potholes Reserve management areas except for authorized administrative or emergency purposes.

- Prohibit motorized watercraft in the Upper West Arm and East Lind Coulee Arm HMAs year-round.

Managed/Limited Motorized Access

- Maintain 35.8 miles of the primitive/gravel road network open year-round or seasonally to discourage random off-road vehicle use.

- Restrict watercraft to low speed/minimum wake operation in the Upper Crab Creek Arm HMA year-round.

- Seasonally restrict watercraft to low-speed/minimum wake operation in the Dunes/Sand Islands management area from April 15 through June 30 to enhance wildlife nesting and breeding success for grebes and colonial nesting birds.

- Motorized road travel within the RMP study area would be limited to designated roads and parking areas only.

Resource Protection and Enhancement:

- Provide permanent or portable toilets in high use dispersed camping areas where human wastes pose a public health concern or environmental hazard (see Figures 2-6.1, 2-6.2 and 2-6.3 for site locations).

- Revegetate 7.8 miles of primitive road not needed for public or agency access.

- Prohibit the discharge of firearms reservoir-wide except from September 1 to February 1. Continue year-round prohibition on guns in North Potholes Reserve and Potholes State Park.

2.5.4 Alternative D - Recreation Development

Alternative D, the Recreation Development alternative, expands the recreation potential and range of developed recreation opportunities at Potholes Reservoir. Although dispersed, unstructured recreation activities would continue to typify public use outside Potholes State Park, new or added recreation facilities and amenities would be provided in the most popular, high use areas.

R27E R28E

North Potholes Reserve

North Potholes Reserve Watchable Wildlife Area

West Lake/ North Outlet Watchable Wildlife Area

Access Restric

Peninsula North

Upper Crab Creek Arm

Moses Lake

North Outlet

South Outlet

Dispersed Camping
No Improvements
Designated Access

Sand Dunes Road

Cartop Boat Launch

Powerline Boat Launch
Improve Boat Launch
and Parking Area

Powerline Road

Upper West Arm

Job Corps Dike Boat Launch

Peninsula South

Job Corps Dike
Dispersed Camping
No Improvements

Lower Crab Creek Arm

Peninsula South
Dispersed Camping
No Improvements

Eastern Dunes

Eastern Bluffs
Provide ORV Access Route

Dunes/Sand Islands

O'Sullivan Site - North
Develop as Unit
of Potholes State Park

Until Developed -
Provide Seasonal Toilets
Fence Parking Area
Day Use Only

Winchester Wasteway

Lower West Arm

Main Reservoir

See Figure 2-7.2

T17N T18N

Watchable Wildlife Trail

Frenchman Hills Wasteway

Potholes State Park

Proposed Campground Expansion Area

Proposed Bike/Pedestrian Trail

Mar Don Resort

262

Blythe Boat Launch
Improve Cartop Boat Launch
No Dispersed Camping
SPRC Fee Area

Grant County

Study Area

Washington State

Alternative D - Potholes Reservoir FEIS Recreation Development Figure 2-7.1

RMP Study Area
Management Areas
Habitat Management Areas
Grant County ORV Area
Minimum Wake Year-Round
Minimum Wake April 15 - June 30
No Motorized Watercraft
Enhance Diking System

Watchable Wildlife Areas
- North Potholes Vehicle Route
- Open Access
- Restricted Access
- Developed Recreation Area

Dispersed Camping Areas
- Closed Year Round
- Open Year Round
- Seasonally Open (Closed March 15-June 30)
- Designated Dispersed Camping Areas

Grazing Permit TP-01
- Seasonal Grazing March 15 - April 15
- Seasonal Grazing November 1 - March 15

Misc. Improvements
- Dikes
- Powerline
- Install Vault Toilet
- Provide Seasonal Toilets
- Provide Courtesy Dock

Roads
- Highway/Improved Roads
- Primitive (Closed)
- Primitive (Open)
- ORV Trails
- Gate

Alternative D
Recreation Development

Potholes Reservoir
Resource Management Plan
Final Environmental Impact Statement

N

0.5 0 0.5 1 1.5 2 Miles

U.S. Department of the Interior Bureau of Reclamation

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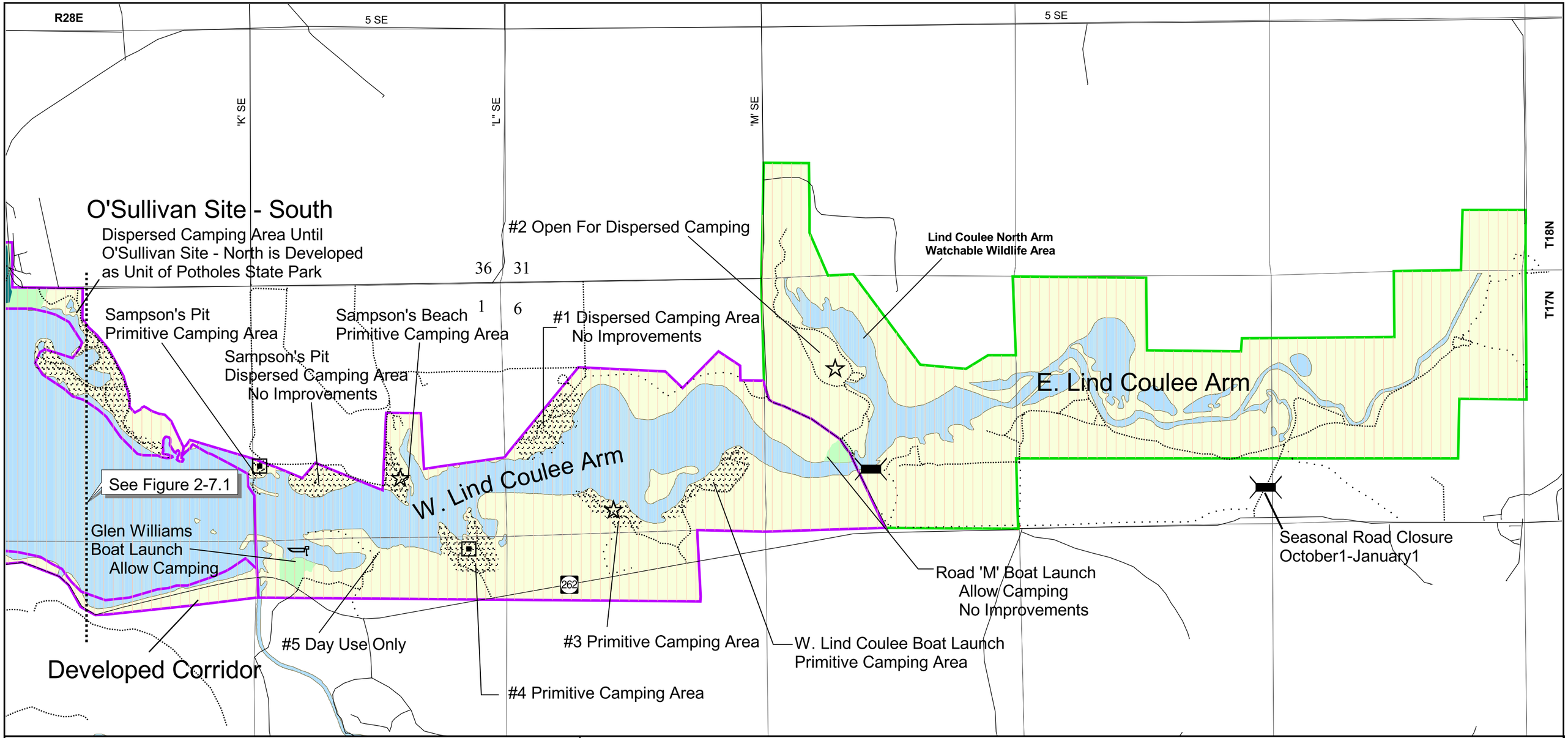

Alternative D: Recreation Development

Potholes Reservoir Resource Management Plan FEIS

RMP Study Area

Management Areas

Watchable Wildlife Areas

Developed Recreation Area

Dispersed Camping Areas

- Closed Year-Round Except In Designated Areas
- Open Year-Round
- Designated Dispersed and Primitive Camping Areas

Misc. Improvements

- Provide Seasonal Toilets
- Install Vault Toilet
- Provide Courtesy Dock

Roads

- Highway/Improved Roads
- Primitive (Closed)
- Primitive (Open)
- Gate

N

Scale 1:24,000

0.5 0 0.5 Miles

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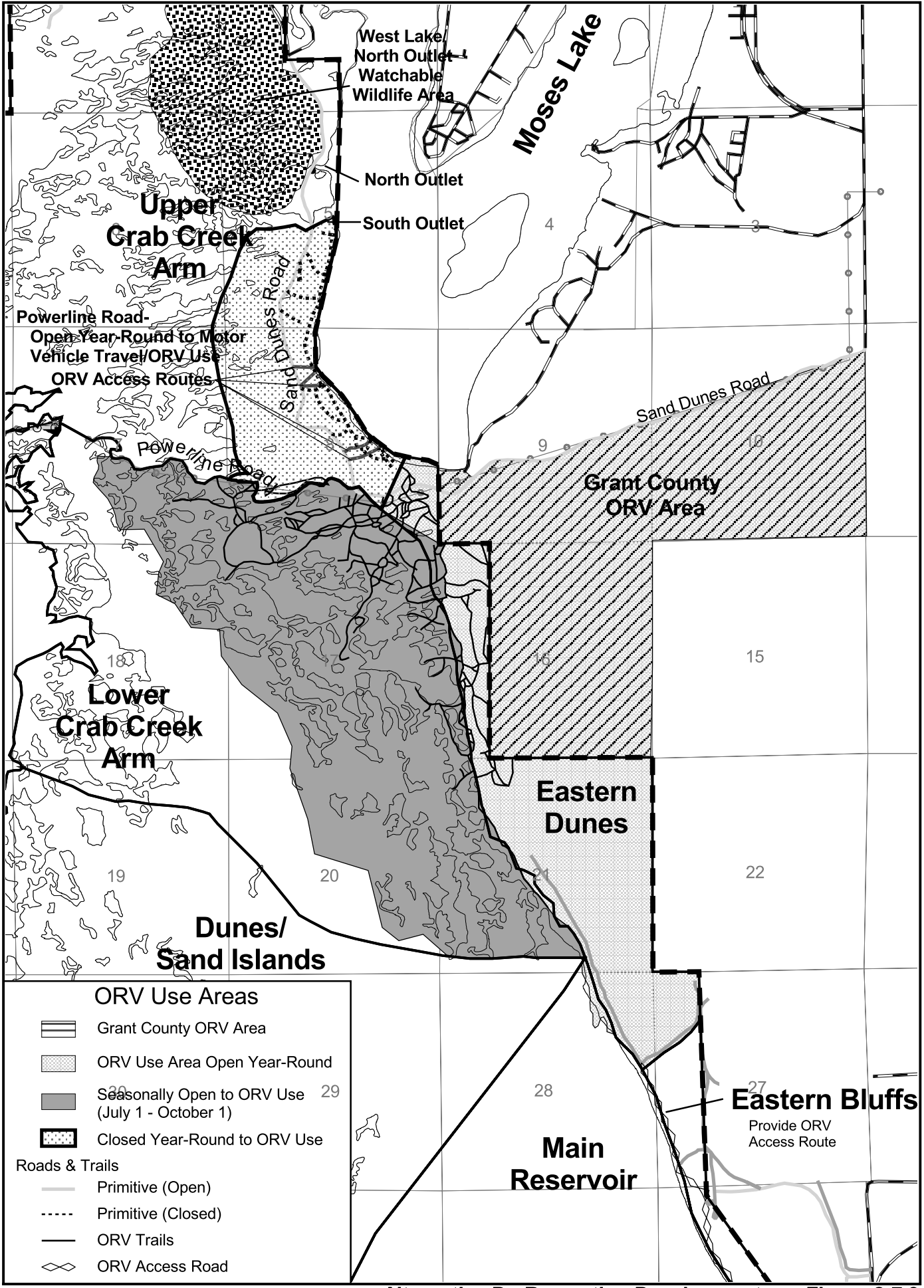
Alternative D - Potholes Reservoir FEIS
Recreation Development Figure 2-7.2



Alternative D - Recreation Development Figure 2-7.3

Consistent with a "recreation development" emphasis, Alternative D provides the highest level of recreation site and facility development and designates the largest area "open" for dispersed camping. Developed and primitive recreation facilities would be provided at specific sites determined environmentally suited for public use. However, similar to the other RMP alternatives, public use would be discouraged or controlled in areas with environmental sensitivities or specific resource constraints.

Under this alternative, recreation management responsibilities within the Developed Corridor would be transferred to the SPRC. Consistent with this transfer and existing SPRC policy, public hunting and dispersed camping would no longer be allowed in this area, and SPRC boat launching and overnight parking fees would be collected at the Blythe Boat Launch facility.

Most of the plan features and actions included in Alternative D (see Figures 2-7.1, 2-7.2 and 2-7.3) are the same as the Preferred Alternative. Therefore, the following discussion highlights what management actions are either different or added features compared to Alternative B. Similar to the other action alternatives, Alternative D would facilitate greater coordination among the many agency programs, plans, and actions as they apply to Reclamation lands at Potholes Reservoir.

Natural Resources:

Vegetation and Weed Control:

- Limit motor vehicle travel and ORV use within the 1,459-acre Lower Crab Creek Arm management area to designated roads and trails to protect wildlife habitat. Similar to the Preferred Alternative, severely damaged areas would be rehabilitated and an interpretive trail developed to illustrate habitat restoration efforts.

Fish and Wildlife:

- Designate the Upper West Arm as an HMA. The management actions associated with this HMA designation would be the same as detailed under the Preferred Alternative.

- No seasonal public access restrictions would be implemented in the south/central portion of North Potholes Reserve.

R27E R28E

North Potholes Reserve

North Potholes Reserve Watchable Wildlife Area

West Lake/ North Outlet Watchable Wildlife Area

Access Restric

Peninsula North

Upper Crab Creek Arm

Moses Lake

North Outlet

South Outlet

Dispersed Camping
No Improvements
Designated Access

Sand Dunes Road

Cartop Boat Launch

Powerline Boat Launch
Improve Boat Launch
and Parking Area

Powerline Road

Upper West Arm

Job Corps Dike Boat Launch

Peninsula South

Job Corps Dike
Dispersed Camping
No Improvements

Lower Crab Creek Arm

Peninsula South
Dispersed Camping
No Improvements

Eastern Dunes

Eastern Bluffs
Provide ORV Access Route

Dunes/Sand Islands

O'Sullivan Site - North
Develop as Unit
of Potholes State Park

Until Developed -
Provide Seasonal Toilets
Fence Parking Area
Day Use Only

Winchester Wasteway

Lower West Arm

Main Reservoir

See Figure 2-7.2

T17N T18N

Watchable Wildlife Trail

Frenchman Hills Wasteway

Potholes State Park

Proposed Campground Expansion Area

Proposed Bike/Pedestrian Trail

Mar Don Resort

262

Blythe Boat Launch
Improve Cartop Boat Launch
No Dispersed Camping
SPRC Fee Area

Grant County

Study Area

Washington State

Alternative D - Potholes Reservoir FEIS Recreation Development Figure 2-7.1

RMP Study Area
Management Areas
Habitat Management Areas
Grant County ORV Area
Minimum Wake Year-Round
Minimum Wake April 15 - June 30
No Motorized Watercraft
Enhance Diking System

Watchable Wildlife Areas
- North Potholes Vehicle Route
- Open Access
- Restricted Access
- Developed Recreation Area

Dispersed Camping Areas
- Closed Year Round
- Open Year Round
- Seasonally Open (Closed March 15-June 30)
- Designated Dispersed Camping Areas

Grazing Permit TP-01
- Seasonal Grazing March 15 - April 15
- Seasonal Grazing November 1 - March 15

Misc. Improvements
- Dikes
- Powerline
- Install Vault Toilet
- Provide Seasonal Toilets
- Provide Courtesy Dock

Roads
- Highway/Improved Roads
- Primitive (Closed)
- Primitive (Open)
- ORV Trails
- Gate

Alternative D
Recreation Development

Potholes Reservoir
Resource Management Plan
Final Environmental Impact Statement

N

0.5 0 0.5 1 1.5 2 Miles

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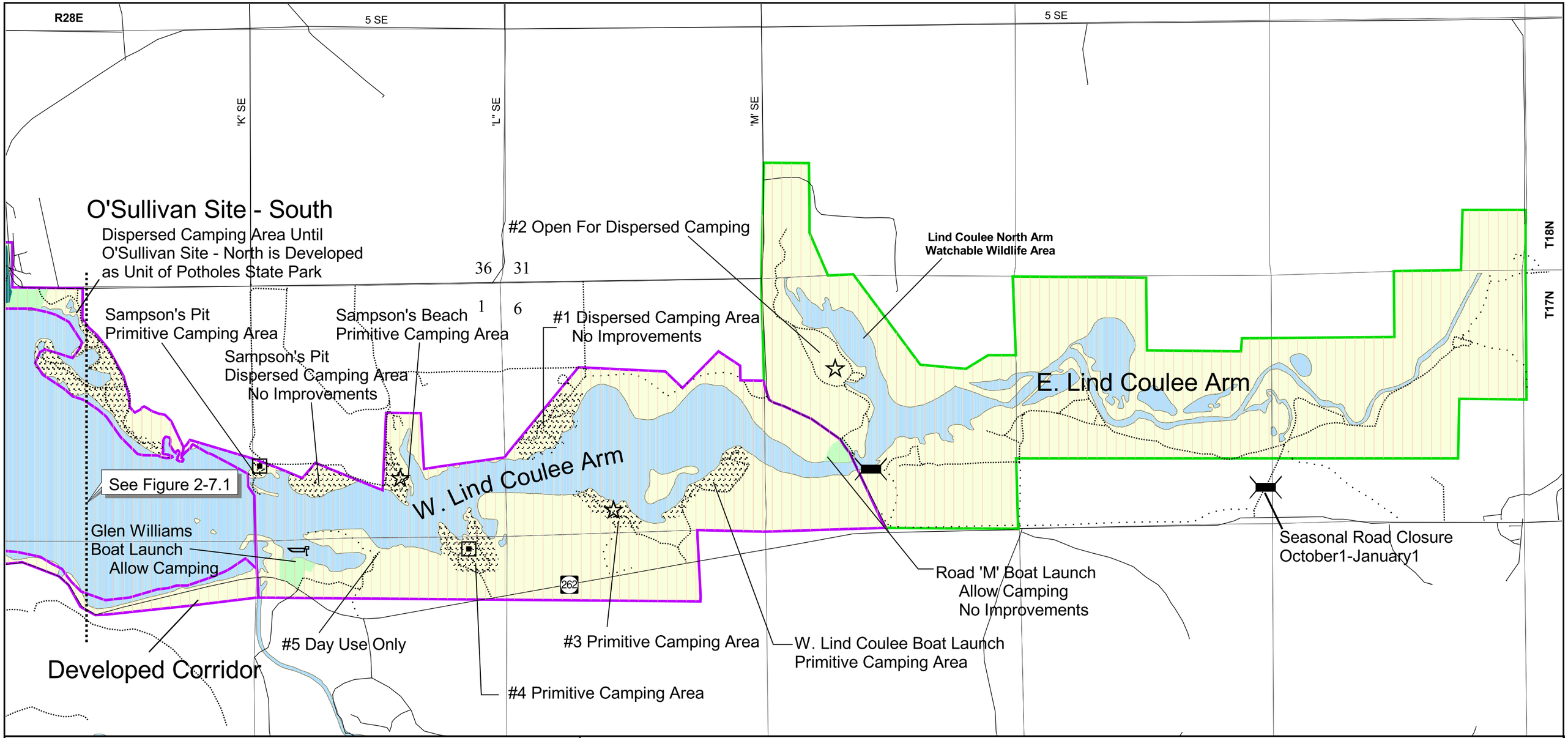

Alternative D: Recreation Development

Potholes Reservoir Resource Management Plan FEIS

RMP Study Area

Management Areas

Watchable Wildlife Areas

Developed Recreation Area

Dispersed Camping Areas

- Closed Year-Round Except In Designated Areas
- Open Year-Round
- Designated Dispersed and Primitive Camping Areas

Misc. Improvements

- Provide Seasonal Toilets
- Install Vault Toilet
- Provide Courtesy Dock

Roads

- Highway/Improved Roads
- Primitive (Closed)
- Primitive (Open)
- Gate

N

Scale 1:24,000

0.5 0 0.5 Miles

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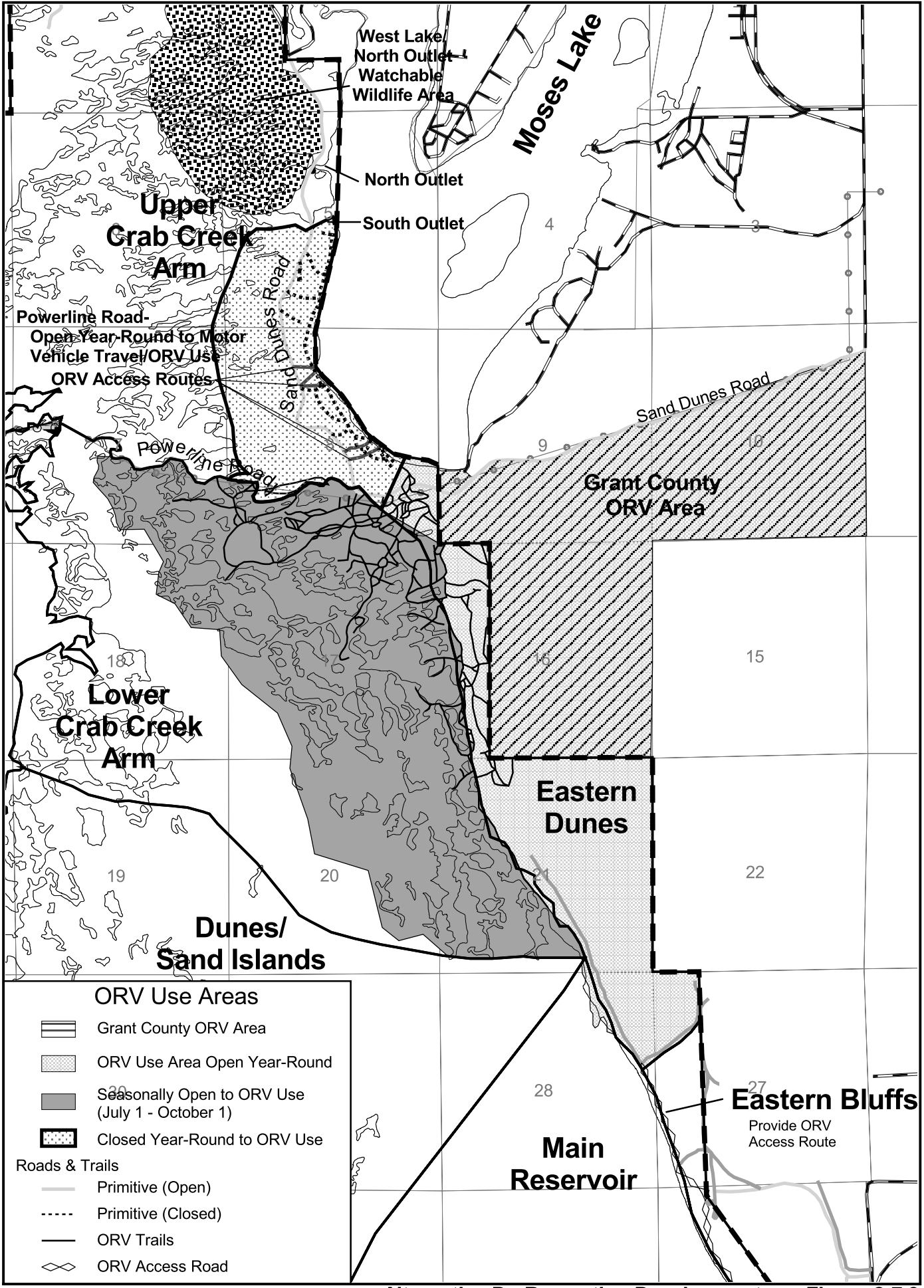
Alternative D - Potholes Reservoir FEIS
Recreation Development Figure 2-7.2



Alternative D - Recreation Development Figure 2-7.3

Water Quality:

- Work with Grant County Mosquito Control District # to avoid or minimize chemical mosquito control methods within the Upper West Arm management area. If mosquito control is determined necessary, BTI or similar biological control methods would be used.

Cultural Resources: In addition to the actions described under Alternative A, the Reclamation and/or State would:

- Work with Native Americans with interests at Potholes Reservoir to develop and display appropriate interpretive information on Native American use of the area.

- If cultural resources are found on Reclamation lands "open" to ORV use that are eligible for the National Register, the Grant County ORV Area boundary would be adjusted to protect identified cultural resources and/or sites.
- Conduct Class III surveys and prepare a Cultural Resource Management Plan (CRMP). The CRMP will outline specific actions and methods to protect cultural resources.

- Coordinate with Native Americans with interests at Potholes Reservoir to prepare the CRMP and manage cultural resources.

Recreation: Existing amenities would be maintained and coupled with the development of new recreation sites and facilities for the public's enjoyment. Additional developments and improvements outside Potholes State Park would be focused in popular use areas environmentally suited to accommodate existing and projected use.

The most popular dispersed camping areas would be designated and managed as "primitive camping areas." These areas would receive some minor sanitation and facility improvements to better accommodate and manage public use in concert with the RMP's wildlife and environmental protection and enhancement goals.

With the transfer of recreation management responsibilities within the Developed Corridor to the SPRC, the Blythe Boat Launch would become a State Park "fee area" for boat launching and overnight parking. Unlike Alternatives A, B and C, dispersed camping would no longer be allowed in the Blythe parking area or in any area located within the Developed Corridor. Public hunting would be prohibited within the Corridor in accordance with SPRC policy.

Recreation Sites and Improvements:

Dispersed Camping Areas:

- Control dispersed camping by limiting and directing use to "designated" areas or sites.

Designate the following management areas as "open" for dispersed camping:

- Peninsula North
- Peninsula South
- Upper Crab Creek Arm (Note: Camping along the west shore of Moses Lake east of Sand Dunes Road would be limited to designated primitive camping areas along the lake shoreline)
- Lower Crab Creek Arm
- Lower West Arm
- Dunes/Sand Islands (Note: At the discretion of the WDFW, specific islands may be seasonally closed with signs to minimize human disturbance to nesting birds, wildlife, and/or improve vegetative restoration efforts).
- Eastern Dunes
- Eastern Bluffs
- East Lind Coulee Arm

Designate the Upper West Arm HMA as "seasonally open" for dispersed camping. The seasonal closure would extend from March 15 through June 30 to enhance wildlife reproductive success.

Designate the following management areas as "closed" to dispersed camping and limit dispersed camping opportunities within these areas to specific sites designated and signed as "open" (see Figures 2-7.1, 2-7.2 and 2-7.3 for site locations).

- O'Sullivan Site - South
- North Potholes Reserve
- West Lind Coulee Arm

Designate the following management areas as "closed" to dispersed camping.

- Developed Corridor
- O'Sullivan Site - North

Primitive Camping Areas:

- Designate and manage 12 primitive camping areas (see Figures 2-7.1, 2-7.2 and 2-7.3 for specific site locations). Minor road improvements (i.e., grading and/or the placement of gravel), the installation of fire rings and grills to delineate individual campsites, and permanent or seasonal vault toilets would be provided. These minimum facility improvements would help control dispersed use and reduce the public health and environmental hazards associated with improper human waste disposal.

Other Recreation-Related Actions:

In addition to the features and actions included in the Preferred Alternative, Alternative D would provide the following:

- Develop additional interpretive trails and overview sites to expand "Watchable Wildlife" opportunities (see "Visitor Information/Interpretation" below for specific features).

- Improve the Powerline boat launch and parking area. The launch ramp and adjacent parking area would be upgraded to better serve boaters with trailers and boat launch traffic and circulation. During high use periods, the site's small size and nearby dispersed camping often interfere with boat launching activities. A permanent vault toilet would also be installed.

- Explore the feasibility of improving the Job Corps Dike boat launch. Upon further study, it may be preferable to improve vehicle and trailer parking and boat ramp usability by relocating the launch facility.

- Provide courtesy docks at the Blythe boat launch site.

- Allow non-motorized access and floating device use year-round within the North Potholes Reserve management area.

- Open 2.7 miles of primitive road to vehicular travel in the East Lind Coulee Arm. These primitive roads are presently closed to motorized travel and may require some improvement (e.g., blading to remove vegetation, grading and/or gravel placement) prior to reopening. This action would enhance public access and recreational opportunities in an area where road access currently is limited.

- Designate and keep the 1.7-mile Powerline Road "open year-round" to motor vehicle travel/ORV use to enhance public access and recreation opportunities in an area where road access currently is limited.

Land Use and Administration:

- Modify the land use agreement between the WDFW and Grant County to operate and maintain an ORV Area as detailed under Alternative A - No Action.

- Transfer "lead agency" recreation management responsibilities within the Developed Corridor to the SPRC. Expanded SPRC operation and maintenance responsibilities would include the Blythe Boat Launch facility and the bicycle and pedestrian trail linking Potholes State Park to O'Sullivan Dam.

Off-Road Vehicle Management:

- ORV riding within the RMP study area would continue within the existing "Yellow" and "Green" zones located in the Lower Crab Creek Arm and Eastern Dunes management areas, respectively. No season-of-use changes would be made. The 1,895-acre "Green Zone" would remain "open year-round" and the 1,459-acre "Yellow Zone" would be "seasonally open" from July 1 to October 1, on designated roads and trails only.

- Designate four "Red Zone" access routes between Sand Dunes Road and Moses Lake as "open" to motor vehicle travel and ORV riding (see Figure 2-7.1). Outside these four travel corridors, the "Red Zone" year-round ORV closure would continue and roadside fencing installed to prevent indiscriminate ORV entry along the east side of Sand Dunes Road.

- Continue the ORV closure within the Eastern Bluffs management area, but authorize a permanent 1.3-mile ORV access route linking the Eastern Dunes management area to the O'Sullivan Site.

- Revise ORV Area signs to clearly depict ORV Area boundaries and travel and riding restrictions.

- Inventory and evaluate the presence of cultural resources and sites within the Eastern Bluffs and Eastern Dunes management areas. If significant cultural resources are identified and determined eligible for the National Register, modify

the ORV Area boundary or implement area-specific closures to exclude ORV travel from these sensitive cultural properties.

- Designate and keep the 1.7-mile Powerline Road "open year-round" to motor vehicle travel/ORV use.

Grazing Management would be the same as Preferred Alternative.

Visitor Information/Interpretation: In addition to the "Watchable Wildlife" features outlined under Alternatives A and B, Alternative D includes the following element (see Figures 2-7.1, 2-7.2 and 2-7.3 for site locations):

– Potholes State Park/Winchester Wasteway Trail: Develop a pedestrian "Watchable Wildlife" hiking trail between Potholes State Park and the Winchester Wasteway. The 3.5-mile trail would traverse through shrub steppe, wetland and riparian habitats adjacent to the reservoir's western shoreline. The area provides high quality wildlife habitat in an essentially undisturbed and undeveloped context. The trail would require a foot bridge across the Frenchman Hills Wasteway.

Public Health and Safety/Environmental Protection:

Managed/Limited Motorized Access

- Maintain 47.3 miles of the primitive/gravel road network open year-round or seasonally to discourage random off-road vehicle travel.

- Restrict motorized water craft use to low-speed/minimum wake operation in the Upper West Arm HMA from March 15 through June 30 to enhance wildlife nesting and breeding success for grebes, waterfowl, and other shorebirds.

- Limit "Yellow Zone" motor vehicle travel and ORV riding to designated roads and trails only.

- Designate and "open" to motorized travel 2.7 miles of primitive road in the East Lind Coulee Arm (see Figure 2-7.2). Reopening and improving these roads by grading and/or gravel surfacing would enhance public access and recreation opportunities in an area where road access currently is limited.

- Retain the "Red Zone" year-round ORV closure except along designated ORV access routes between Sand Dunes Road and Moses Lake.

Resource Protection and Enhancement: Same as the Preferred Alternative except that there would be no seasonal restriction on non-motorized public access and floating device use in the south/central portion of North Potholes Reserve; and no additional firearm discharge restrictions would be adopted.

CHAPTER 3
EXISTING RESOURCE CONDITIONS

3.1 ASSESSMENT OF THE NEED FOR CHANGE

The Potholes Reservoir Management Area has a rich diversity of natural resources and is recognized locally and regionally for its recreation opportunities. The reservoir offers fishing, camping, swimming, boating, wildlife observation, and other recreation opportunities to thousands of visitors annually. There is an inherent need for a comprehensive management plan in each of the defined management areas to conserve and protect the land and water resources so the public may continue to enjoy all the recreation opportunities available at Potholes Reservoir.

Arid ecosystems, like the lands surrounding Potholes Reservoir, tend to be more susceptible to human disturbance and require longer periods of time to recover than do wetter areas that receive more rainfall. Drier landscapes usually require restoration to expedite vegetative succession, but some disturbed areas never recover. Other factors influencing the fragility of the acreage around Potholes Reservoir include precipitation events and erosion. While xeric landscapes receive little rainfall annually (< 12"/year) compared to other mesic areas, the precipitation events are characterized by short, intense thunderstorms. When they occur, these storm bursts inevitably wash the soil into the reservoir, and water resources/quality begin to be effected. Arid landscapes are prone to erosion, and the soil loss is rapid following the disturbance. Consequently, land use effects water resources and vice versa. Proper land and water management practices will prevent or reduce potential environmental and resource-related problems. The implementation of a RMP for the Potholes Reservoir Management Area will only further contribute to the uniqueness of the area by providing a safe and beautiful place for people and natural resources to exist together.

With increased use from the recreating public, the quality of the natural resources found at Potholes Reservoir is projected to decline as well as accelerate conflicts between future recreation and natural resource protection needs. This trend is expected to continue unless future resource and recreation management decisions are made through a coordinated and integrated RMP tailored to the existing resource conditions and needs.

3.2 NATURAL RESOURCE SUMMARY

This chapter summarizes existing resource conditions in the Potholes Reservoir Management Area at the time of implementing the RMP (see Figures 3.2-1 and 3.2-2 “Current Conditions”). Natural, cultural, and aesthetic resources are addressed, followed by a general description of the local and regional management area relative to social and economic resources.

North of the dam, pothole wetlands, riparian, and shrub-steppe plant communities and sand dunes characterize the area. A unique system of sand islands was created when the shifting sand dunes were inundated. Over time, wetland and riparian plant communities recolonized the dynamic island and reservoir shoreline. Emergent wetland communities developed, and riparian forest and shrub communities dominated by willow matured in these shoreline areas. These changes have created new or enhanced habitat for some wildlife populations along with additional recreation opportunities.

Potholes Reservoir is managed by WDFW under the CBWA Management Plan. The CBWA includes eastern Washington lands within Grant, Adams, Franklin, and Douglas Counties. The WDFW owns 43,000 acres fee title, leases some tracts from the WDNR, and has agreements for management of federal lands with the USFWS, the U.S. Department of Energy (USDOE), the BLM, and Reclamation. The WDFW manages a total of 260,000 acres under the plan. To date, no specific CBWA management plan for the Potholes Reservoir unit has been developed.

3.2.1 Climate

The Cascade Range and the Rocky Mountains greatly influence the climate in the Columbia Basin and Potholes Reservoir Management Area. The Rocky Mountains shield the Columbia Basin from the more severe winter storms moving southward across Canada, while the Cascade Range forms a barrier to the easterly movement of moist air from the Pacific Ocean (SCS, 1984). However, some air from each of these sources reaches the Columbia Basin and affects the climate at Potholes Reservoir.

Due to Pacific high pressure systems from May through September, the recreation season is generally hot and dry. From late June until September, sunshine is abundant. Summer precipitation mainly occurs either as brief showers or as short, intense thunderstorms. In the winter, the average temperature at Quincy (the nearest climatological station) is 30°F. The average daily minimum temperature is 21°F. In the summer, the average temperature is 83°F. The total annual precipitation is about eight inches and the average snowfall is 22 inches. Chinook winds which blow down slope and are warm and dry, often melt and evaporate the snow. The prevailing wind is from the west-northwest. Average windspeed is highest in the spring at eight miles per hour (Soil Survey of Grant County Washington). The water at Potholes Reservoir can be extremely rough and dangerous within minutes of a storm's approach, requiring boaters to seek shoreline refuge as quickly as possible.

R27E R28E

North Potholes Reserve

Moses Lake

Upper Crab Creek Arm

North Outlet

South Outlet

Peninsula North

Sand Dunes Road

Cartop Boat Launch

Powerline Boat Launch

Powerline Road

Sand Dunes Road

Peninsula South

Upper West Arm

Job Corps Dike Boat Launch

Lower Crab Creek Arm

Eastern Dunes

Eastern Bluffs

Dunes/Sand Islands

O'Sullivan Site - North

T18N

T17N

Winchester Wasteway

Lower West Arm

Main Reservoir

See Figure 3.2-2

Potholes State Park

Frenchman Hills Wasteway

Developed Corridor

Proposed Campground Expansion Area

Proposed Bike/Pedestrian Trail

Mar Don Resort

262

Grant County

Study Area

Washington State

Current Conditions

Potholes Reservoir Resource Management Plan

Current Conditions - Potholes Reservoir RMP

Figure 3.2-1

RMP Study Area

Management Areas

Grant County ORV Area

Designated Dispersed Camping Areas

Watchable Wildlife Areas

North Potholes Vehicle Route

Open Access

Restricted Access

Developed Recreation Area

Dispersed Camping Areas

Closed Year Round

Open Year Round

Seasonally Open (Closed March 15-June 30)

Designated Dispersed Camping Areas

Grazing Permit TP-01

Seasonal Grazing March 15 - April 15

Seasonal Grazing November 1 - March 15

Misc. Improvements

Dikes

Powerline

Install Vault Toilet

Provide Seasonal Toilets

Provide Courtesy Dock

Roads

Highway/Improved Roads

Primitive (Closed)

Primitive (Open)

ORV Trails

Gate

N

0.5 0 0.5 1 1.5 2 Miles

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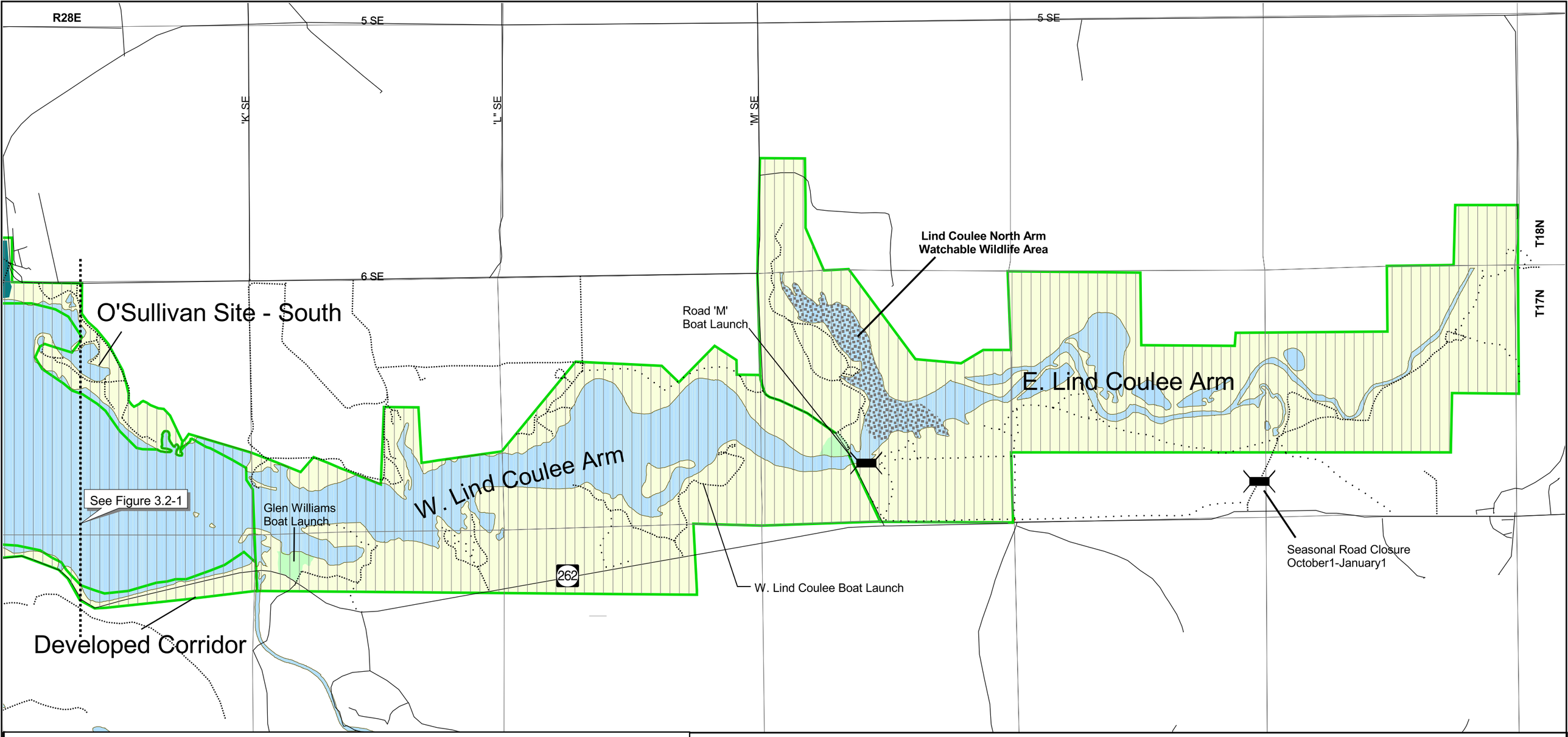

Current Conditions
Potholes Reservoir Resource Management Plan

RMP Study Area

Management Areas

Watchable Wildlife Areas

Developed Recreation Area

Dispersed Camping Areas

Open Year-Round

Roads

Highway/Improved Roads

Primitive (Closed)

Primitive (Open)

Gate

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N

Scale 1:24,000

0.5 0 0.5 Miles

Current Conditions - Potholes Reservoir RMP
Figure 3.2-2

3.2.2 Air Quality

The Washington State Department of Ecology's (WDOE) Eastern Regional Air Pollution Control Authority Office and the U.S. Environmental Protection Agency (EPA) monitor air quality in the Columbia Basin region under the provisions of the Clean Air Act, as amended. Washington has developed a State Implementation Plan (SIP) in part to maintain Ambient Air Quality Standards. The status of criteria pollutants, the six principal pollutants regulated by the EPA, are tracked statewide. The six criteria pollutants are particulate matter 10 microns or smaller in diameter (PM_{10}), sulfur dioxide (SO_2), oxides of nitrogen (NO_x), carbon monoxide (CO), ozone (O_3), and lead (Pb).

Grant County does not have permanent or mobile monitoring stations. Therefore, air quality information in the area is limited. The closest monitoring sites to Potholes Reservoir are Spokane to the northeast, and Yakima to the west. These cities also are the nearest non-attainment areas for CO and PM_{10}. Although air quality information for the region is limited, the WDOE and the EPA have designated Grant County as an area currently in attainment for all standards (Seheibner, 1999).

Class I areas have the highest air quality classification and include all international parks, wilderness areas, memorial parks which exceed 5,000 acres, and all national parks which exceed 6,000 acres. Class I areas have land and resource use restrictions to prevent damage to visibility, plant, soil, and other resources. The closest Class I area to Potholes Reservoir is the Spokane Indian Reservation to the east. WDOE's plans for protecting and improving visibility in Class I areas are contained in the air quality SIP.

Locally, particulates are generated from area sources such as dirt roads and plowed fields. Wind erosion is a significant factor in particulate distribution, particularly in the spring and fall when high winds and dry soil conditions create dust storms. The agricultural practice of burning field residue following harvest can also produce high levels of particulate matter. The burning season lasts about one month during late August and September. Although the typical management practice directs smoke away from population centers, total emissions within the airshed are not reduced (Grant County, 1999).

High ORV use at Potholes Reservoir contributes increased air emissions on peak weekends when as many as four thousand ORV recreationists may use the ORV area (Cooke et al., 1997). Specifically these pollutants include hydrocarbons, particulate matter, nitrogen oxides, carbon monoxide, and carbon dioxide. The amount of pollutants generated by current activities has not been estimated.

3.2.3 Geology

The Columbia River flows in a deep valley along the southwestern boundary of the county. The northern part of the county is characterized by loess (windblown silt) mantled hills that have been dissected by the Channeled Scablands (land eroded by cataclysmic flooding in excess of 13,000 years ago). The southern part is generally smooth with a southward-sloping plain that is deeply dissected and is interrupted by the Saddle Mountains and Frenchman Hills. Babcock Ridge and Beezly Hills border the northern part of the plain (USDA, 1984).

The Potholes Reservoir Management Area lies within the Colombia Basin subprovince of the Columbia Intermontane Province. The Columbia Intermontane Province is the product of Miocene flood basalt volcanism and regional deformation that occurred over the past 17 million years. The Columbia Plateau is that portion of the Columbia Intermontane Province that is underlain by the Columbia River Basalt Group.

The Potholes Reservoir is located in the Quincy Basin, a synclinal trough in the folded Columbia Plateau. The Pleistocene floodwaters formed a fast draining lake as they entered this broad basin and as a result dumped large quantities of sediment completely burying the basalt bedrock. Most of the floodwater drained through the Drumheller channels south of the Potholes Reservoir into the Othello Basin where it ponded again to make another temporary lake.

Since the end of the Pleistocene, winds have locally reworked the flood sediments, depositing dune sands in the lower elevations and loess at higher elevations.

The Eastern Bluffs management zone area has a steep relief, generally unvegetated, with the slopes composed of unconsolidated materials (i.e., silt/sand, cobble). These slopes are highly vulnerable to erosion and border directly on the reservoir. This limits possible development and use of the area. The Potholes Reservoir has a continuing inflow of suspended sediment from the wasteways that result in a build-up of sediment which is deposited near mouths of these wasteways. The boat launch area at the State Park is highly impacted by this sediment build-up.

3.2.4 Topography

The landscape of the Potholes Reservoir Management Area is dominated by low relief plains. The surface topography has been modified within the past several million years by several geomorphic processes such as, Pleistocene cataclysmic flooding Holocene eolian activity. Cataclysmic flooding occurred when ice dams in western Washington and northern Montana were breached, allowing large volumes of water to spill across eastern and central Washington forming the channeled scablands and depositing sediment in the Potholes Reservoir area. The last major flood occurred about 13,000 years

ago during the late Pleistocene Epoch. Anastomosing flood channels, giant current ripples, bergmounds, and giant flood bars are among the landforms created by the floods (Easterbrook *et al.*, 1970.)

3.2.5 Soils

Grant County resides in a regional structural basin. The County rests on the lower limb of the Grand Coulee Monocline to the north/northwest and the northern limb of the Frenchman Hills Anticline to the southwest. The region to the northeast, including the Potholes Management Area, is subjected to a 0 to 5 degree dip in the southwest direction. The effect of these structural features is the formation of a regional sediment and groundwater cache basin in and around Potholes Reservoir. In addition to groundwater, this structural low has been the deposition location for southwest prevailing wind-borne silt and sand, making the area an eolian depositional basin as well.

Nearly all of the soils on the Columbia Plateau and in the Columbia drainage basin have been formed under grassland or shrub-grassland vegetation. Soil parent materials in this region include basalt, volcanic ash, sedimentary deposits, glacial outwash, and alluvial, fluvial, and colluvial deposits. Soils are generally covered with windblown sand and silt. Caliche layers occur in most of the soils and are generally seven feet deep. Loess dominated subsoils are moderately saline and contain a moderate amount of exchangeable sodium.

The most recent and comprehensive soils data available for the Potholes Management Area was obtained from the *Soil Survey of Grant County Washington* (SCS, 1984) prepared by the U.S. Department of Agriculture's Natural Resources and Conservation Service (NRCS), formerly the Soil Conservation Service (SCS). The soil survey is an inventory and evaluation of the soils found in Grant County which includes the Potholes Management Area. The survey can be used to adjust existing land uses and land use plans to the limitations and natural potentials of soil resources and their environment (USDA, 1984).

Potholes Reservoir is in the southeast part of Grant County. The RMP Management Area in and around the reservoir includes about 36,200 acres. At high water, about 18,500 acres of soil are exposed, and at low water this number increases considerably. Soils in the RMP management area consist of two broad soil groups and a total of seven general soil map units. Each of the general soil units identifies a broad area that has a distinctive pattern of soils, relief, drainage, and landscape. There is a total of 56 detailed soil map units within the Potholes Reservoir Management Area.

Soils on terraces, active dunes, and alluvial fans are primarily found in the north and western portion of the RMP area (Units 2-7, see Table 3.2-1).

Soils on benches, terraces, hillsides, and ridgetops in areas of channeled scablands dominate the soil types (Units 11 and 12) found only in the southern portion of the management area.

Tables 3.2-1, 3.2-2, 3.2-3and 3.2-4 summarizes Erosion Susceptibility, Limitation Ranges for Building Site Development, Potential Ranges for Providing Wildlife Habitat, and Limitation Ranges for Recreation Development at Potholes Reservoir, respectively.

Table 3.2-1
Soil Unit Erosion Susceptibility
Potholes Reservoir, Washington

Soil Unit	Water Erosion Hazard Range	Wind Erosion Hazard Range
Unit 2: Timmerman-Quincy	Slight to Moderate	Highly Erodible to Extremely Erodible
Unit 4: Ephrata-Malaga	Slight to Moderate	Erodible to Extremely Erodible
Unit 5: Burbank-Quincy	Slight to Moderate	Very Slightly Erodible to Highly Erodible
Unit 6: Quincy	Slight to Moderate	Highly Erodible to Extremely Erodible
Unit 7: Taunton-Scoon	Slight to High	Highly Erodible
Unit 11: Starbuck-Bakeoven-Prosser	Slight to Moderate	None to Highly Erodible
Unit 12: Schawana	Moderate	Slightly Erodible to Highly Erodible

Table 3.2-2
Soil Unit Limitation Ranges for Building Site Development

Soil Unit	Shallow Excavation	Dwelling Without Basement	Local Roads and Streets	Lawns and Landscaping	Septic Tank Absorption Fields
Unit 2: Timmerman-Quincy	Severe	Slight to severe	Slight to severe	Moderate to severe	Severe
Unit 4: Ephrata-Malaga	Severe	Slight to moderate	Moderate	Slight to severe	Severe
Unit 5: Burbank-Quincy	Severe	Slight to severe	Slight to severe	Moderate to severe	Severe
Unit 6: Quincy	Severe	Slight to severe	Slight to severe	Moderate to severe	Severe
Unit 7: Taunton-Scoon	Severe	Moderate to severe	Moderate to severe	Moderate to severe	Severe
Unit 11: Starbuck-Bakeoven-Prosser	Severe	Moderate to severe	Severe	Severe	Severe
Unit 12: Schawana	Severe	Severe	Severe	Severe	Severe

Table 3.2-3
General Soil Unit Potential Ranges for Providing Wildlife Habitat at Potholes Reservoir, Washington

Soil Unit	Openland Wildlife	Wetland Wildlife	Rangeland Wildlife
Unit 2: Timmerman-Quincy	Poor to Good	Very Poor	Not Rated
Unit 4: Ephrata-Malaga	Very Poor to Good	Very Poor	Not Rated
Unit 5: Burbank-Quincy	Poor to Fair	Very Poor	Poor
Unit 6: Quincy	Poor to Fair	Very Poor	Poor
Unit 7: Taunton-Scoon	Fair to Good	Very Poor to Fair	Not Rated
Unit 11: Starbuck-Bakeoven-Prosser	Very Poor to Poor	Very Poor	Poor to Fair
Unit 12: Schawana	Very Poor	Very Poor	Very Poor

Table 3.2-4
Soil Unit Limitation Ranges for Recreation Development Potholes Reservoir, Washington

Soil Unit	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
Unit 2: Timmerman-Quincy	Slight to Severe	Slight to severe	Slight to severe	Slight to Severe
Unit 4: Ephrata-Malaga	Slight to moderate	Slight to moderate	Moderate to severe	Slight to severe
Unit 5: Burbank-Quincy	Slight to Severe	Slight to severe	Moderate to severe	Slight to severe
Unit 6: Quincy	Slight to Severe	Slight to severe	Severe	Slight to severe
Unit 7: Taunton-Scoon	Slight to Severe	Slight to Severe	Slight to Severe	Slight to Severe
Unit 11: Starbuck-Bakeoven-Prosser	Moderate to severe	Moderate to severe	Severe	Severe
Unit 12: Schawana	Severe	Severe	Severe	Slight to moderate

3.2.6 Water Quality

The CBP was started in the early 1930's to provide irrigation water to the fertile but arid lands of the Columbia River basin in central Washington. Water for the CBP originates from the Columbia River where it is pumped from Lake Roosevelt at Grand Coulee Dam into Banks Lake - one of the CBP's principal reservoirs. At the south end of Banks Lake, irrigation diversions are made into the Main Canal at Dry Falls Dam. Main Canal waters flow through lined and unlined sections, tunnels, and siphons before terminating downstream from Billy Clapp Lake into the East Low Canal and West Canal which more or less form the CBP's project's east and west boundaries.

Annually, the CBP diverts about 2.6 million acre-feet of water out of the Columbia River to deliver irrigation water to agricultural lands that normally receive less than 10 inches of precipitation a year. After use in the north half of the CBP (on the Quincy and East Columbia Basin Irrigation Districts), much of the water is collected and returned through a series of wasteways to Potholes Reservoir for reuse in the southern half of the CBP by the South Columbia Basin Irrigation District.

Moses Lake, the largest natural lake in the area, receives its water in the form of natural inflow, irrigation return flows, and canal water originating from the Columbia River. Natural inflow comes from Upper Crab Creek, an intermittent tributary with its headwaters west of Spokane, Rocky Ford Creek, a year-round spring-fed creek that originates southeast of Soap Lake, and a few small drainages to the east. Moses Lake serves as the main supply route for water passing from the East Low Canal, Upper Crab Creek, and Rocky Ford Creek south to Potholes Reservoir.

Created by O'Sullivan Dam, Potholes Reservoir lies immediately downstream of Moses Lake in the Lower Crab Creek Basin. Built as part of the CBP, the reservoir's main water supply is operational waste and irrigation return flow from northern CBP lands irrigated from the East Low and West Canals. This water supply is supplemented by natural flows in Crab Creek, Rocky Coulee, Weber Coulee, and Lind Coulee. Reservoir inflows originate from Moses Lake through the Crab Creek channel on the north side, from the Lind Coulee Wasteway on the east side, and from the Winchester and Frenchman Hills Wasteways on the west side. Shallow groundwater seepage is also a water source entering Potholes Reservoir. Irrigation water for the southern part of the CBP is distributed via the Potholes East Canal which begins at O'Sullivan Dam.

At a full pool elevation of 1,046.5 feet, Potholes Reservoir covers an estimated 27,800 acres and has a total storage capacity of 511,700 acre-feet. Of this capacity, 179,200 acre-feet is inactive, 300 acre-feet is dead pool, and 332,200 acre-feet is active conservation allocated for irrigation use. The reservoir has an average depth of 18 feet and a maximum depth of 142 feet.

When the difference between outflow and inflow (outflow being higher) is greatest, from June to August, the reservoir elevation on average is about 12 feet below full pool. At low water levels, many of the dunes/sand islands located in the northern half of the reservoir area become exposed and difficult to access. These islands are very popular for dispersed camping, sunbathing, and other recreational activities in the spring and early summer when reservoir elevations are high and optimal for boat-in accessibility. As reservoir water surface elevations decline, so does recreational visitation and use within the Potholes Management Area.

Surface Water Quality

Updated in November 1997, the surface water quality standards for the State of Washington are described in Chapter 173-201A of Washington's Administrative Code (WAC). The chapter establishes surface water quality standards consistent with public health and enjoyment, and the propagation and protection of fish, shellfish, and wildlife (WAC 173-201A-010). In conformance with present and potential uses of the state's surface waters and in consideration of natural water quality limitations and potential, the state has classified its waters according to the beneficial uses that can be obtained from them and has established water quality criteria for each classification.

The water quality standards and beneficial use criteria applicable to Potholes Reservoir are defined under the "Lake Class" designation. Lake Class waters are expected to meet or exceed the requirements for water supply (domestic, industrial, agricultural), stock watering, fish and shellfish (salmonid and fish migration, rearing, spawning and harvesting, and clam, mussel and crayfish rearing, spawning, and harvesting), wildlife habitat, recreation (primary contact recreation, sport fishing, boating, and aesthetic enjoyment), and commerce and navigation.

Although there is a general lack of water quality data specific to Potholes Reservoir, water samples collected from various reservoir locations on September 4 and October 3, 1998 were reviewed to assess potential lake conditions and/or limitations.

Under the State's Lake Water Quality Assessment Program, a lake specific study was conducted at Potholes Reservoir during the summers of 1998 and 1999 by the WDOE. The assessment was conducted to determine appropriate total phosphorus concentrations to protect characteristic lake uses.

None of the water quality data gathered to date show constituent concentrations above the maximum contaminant levels (MCLs) established under the National Primary Drinking Water Regulations (EPA, 1997). These determinations consider the criteria for chemical, biological, or physical parameters which have been established to provide a level of water quality that supports designated beneficial uses (Planning File).

Environmental Contaminants and Biota

Potholes Reservoir fish and bottom sediment samples were collected and analyzed in 1992-1993. Whole-body largescale suckers were analyzed for EPA priority pollutant metals, organophosphate pesticides, chlorinated pesticides, and polychlorinated biphenyls (PCBs). Fish muscle tissue samples were analyzed for mercury, chlorinated pesticides, organophosphate pesticides, and PCBs. Bottom

sediment samples were analyzed for all of the above constituents as well as semivolatile organics and triazine herbicides.

Of the five lakes which underwent the WDOE's comprehensive survey, the overall contamination of sediment and fish at Potholes Reservoir was the lowest. None of the Potholes sediment samples exceeded the Ontario Province Sediment Quality Guidelines for metals or organic compounds, and low concentrations of nine chlorinated pesticides, including, were detected in Potholes fish. Only lake whitefish and largemouth bass muscle tissues exceeded the EPA human health criterion for dieldrin.

On the basis of the dieldrin concentrations measured, Potholes Reservoir remains listed on the State's 1998 Section 303(d) list submitted to EPA. Under the Clean Water Act, the 303(d) list identifies water quality limited, impaired, and threatened waters needing additional work beyond existing controls to achieve or maintain the surface water quality standards established (WDOE, 1996). Also listed on the 303(d) list is Potholes East Canal.

Ground Water Quality

Existing data for the public water supply wells found within or near the Potholes RMP boundary were reviewed to determine whether the MCLs established for ground water were being met. Sulfate concentrations ranged from 9.0 to 87.0 mg/L, with a mean of 42.8 mg/L. Sodium ranged from 21.0 to 60.0 mg/L (mean of 38 mg/L); chloride from 5.0 to 58.0 mg/L(mean of 32.8 mg/L); nitrate from 4.2 to 16.7 mg/L (mean of 8.63 mg/L); iron from 0.01 to 1.09 mg/L (mean of 0.20 mg/L); and manganese from 0.01 to 0.07 mg/L (mean of 0.022 mg/L). Cumulatively, these total dissolved solids (TDS) ranged from 286 to 609 mg/L, with an average value of 480 mg/L. In general, ground-water from shallow wells was the most contaminated and water taken at depth was the least contaminated.

With the exception of the Sunrise Water Association, whose well is screened off below 500 feet, all the public groundwater systems examined had water quality problems and MCL exceedances. Of the eleven wells examined, four wells exceeded the 10 mg/L MCL for nitrate, eight wells exceeded the MCL for lead, three exceeded the MCL for TDS, two exceeded the MCL for manganese, and one exceeded the MCL for iron. Overall, the well data generally indicate that groundwaters pumped from the shallower overburden aquifer around Potholes Reservoir are suitable for agriculture and industrial use, and those pumped from depths equivalent to the lower aquifer units are suitable for all beneficial uses including public drinking water supplies.

Nitrate concentrations in ground water supplies are currently monitored by the Washington Department of Health (WDOH), in cooperation with the county health districts, since they are a good indicator of potentially acute public health effects. The WIGWC report noted that irrigation and agricultural

practices account for a majority of the nitrogen loading. Shallow wells (less than 300 feet in depth) appear to be at much greater risk for nitrate contamination than deeper wells. Most larger public water supply wells are drilled deep to maximize the volume of water available, and most private domestic drinking water wells are shallow and rarely exceed the first major water bearing zone encountered. This practice places the shallow domestic wells at higher risk for water quality problems (WIGWC, 1996).

3.2.7 Vegetation

The Potholes Reservoir Management Area is within the shrub-steppe vegetation zone described by Franklin and Dyrness (1973). This upland zone is dominated by sagebrush, bitterbrush, and large perennial bunchgrasses such as bluebunch wheatgrass (*Agropyron spicatum*) and Idaho fescue (*Festuca idahoensis*). Community composition depends upon many factors including substrate, topography, wind action, and human disturbances (Franklin and Dyrness, 1973).

Before the construction of O'Sullivan Dam, vegetation within the Potholes Management Area was arranged in zones along a moisture gradient. These zones from dry to wet were: (1) no vegetation on high, dry, shifting sand dunes; (2) *Psoralea* sp. on the windward faces of lower shifting dunes with sand dock and willows on the leeward faces; (3) rabbitbrush, sagebrush, spiny hopsage, cheatgrass, Indian ricegrass and alkali cordgrass on semi-stable sand dunes; (4) Baltic rush-sedge meadows; (5) bulrush-cattail wetlands; and (6) submerged aquatic plants (USFWS, 2000). Permanent and temporary potholes (800-1,000), flooded flats, creeks fed by springs fed potholes, and extensive marshlands covered the area (Harris 1954).

Overgrazing in the early part of the century resulted in the destruction of native plant cover and the formation of a broad area of active sand dunes (Zook, 1978). Fire also likely impacted the native shrub-steppe plant communities. Due to the area's arid climate and presence of sandy soils, however, native plant community recovery is slow. As indicated by Franklin and Dyrness (1973), such recovery is further hampered in the fragile uplands due to their susceptibility to invader plant establishment on disturbed sites.

The upland vegetation currently found at the reservoir is dominated by native shrubs and introduced annual grasses. There are only remnant patches of native vegetation (as described by Franklin and Dryness, 1973) remaining. Since the creation of Potholes Reservoir, the aerial extent of riparian habitat, particularly riparian shrub and riparian forest, has increased considerably and is dominated by woody species such as willow. Large areas of emergent herbaceous wetlands are also present, while some areas have only minimal vegetative cover.

The USFWS conducted a HEP study at Potholes Reservoir in 1999 (USFWS, 2000) to acquire baseline data on current habitat conditions and to determine impacts from recreational use on wildlife and vegetative communities. Based on the vegetative data collected, the USFWS concluded "it appears that recreational activities, especially ORV use, have lowered habitat quality, or at least prevented it from recovering from previous conditions." Specifically, the study showed that the areas subjected to ORV use have less vegetative cover and fewer desirable native species.

Aside from ORV use, other dispersed activities have impacted the area's vegetative communities. These disturbances have also allowed various weeds to proliferate along the edges of roads, "informal" roads leading to popular fishing spots, undeveloped boat launch sites, camping sites, have all removed a certain amount of habitat. Camping and parking areas have caused similar losses and changes (USFWS, 2000).

Dominant Cover Types and Conditions by Management Area

Table 3.2-5 lists the dominant vegetative cover types by management area and identifies their relative condition (very poor to excellent) by acreage. The lesser cover types occurring within the management area are not represented. The Main Reservoir Management Area is comprised of water year round and is not applicable.

Table 3.2-5
Dominant Cover Types, Condition, and Acreage by Management Area

Management Area	Cover Type	Condition	Acreage
North Potholes Reserve	Shrub Grass	good	749
	Shrubland	good	1838
	Riparian Forest	good to excellent	595
Peninsula North	Shrub Grass	good to excellent	454
	Shrubland	good to excellent	1616
Peninsula South	Exposed	poor	189
	Shrub Grass	fair to good	185
	Shrubland	good to excellent	1497
	Dense Shrubland	good to excellent	159
Upper Crab Creek Arm	Shrubland	fair to good	757

Table 3.2-5
Dominant Cover Types, Condition, and Acreage by Management Area

Management Area	Cover Type	Condition	Acreage
	Emergent Wetland	poor to fair	491
	Riparian Forest	fair to good	244
	Shrub Grass	fair to good	201
	Grassland	fair to good	112
	Dense Shrubland	good	79
Lower Crab Creek Arm	Shrubland	fair	124
	Emergent Wetland	poor to good	95
	Riparian Forest	poor to good	99
	Riparian Shrub	poor to good	464
	Grassland	poor to good	93
Eastern Dunes	Exposed	very poor	191
	Shrubland	poor	394
	Shrub Grass	poor to fair	62
Eastern Bluffs	Shrubland	poor to good	82
	Agriculture	good	29
Upper West Arm	Shrubland	good	1027
	Riparian Shrub	good	230
	Riparian Forest	good to excellent	379
	Shrub Grass	good to excellent	128
Lower West Arm	Shrub Grass	fair to good	137
	Shrubland	good	600
	Dense Shrubland	good	200
	Very Dense Shrubland	good	122
	Riparian Shrub	good	135
Developed Corridor	Shrubland	good	143
	Very Dense Shrubland	good to excellent	49
	Riparian Forest	good	41

Table 3.2-5
Dominant Cover Types, Condition, and Acreage by Management Area

Management Area	Cover Type	Condition	Acreage
	Dense Shrubland	good to excellent	117
Dunes/Sand Islands	Grassland	fair	84
	Riparian Shrub	fair to good	1144
O'Sullivan (North and South)	Grassland	very poor	98
	Shrub Grass	poor	21
	Shrubland	poor to fair	39
West Lind Coulee Arm	Grassland	poor	313
	Shrub Grass	poor	108
	Dense Shrubland	poor to good	83
	Shrubland	poor to good	44
	Riparian Shrub	poor to fair	27
	Riparian Forest	poor to fair	14
East Lind Coulee Arm	Grassland	fair to good	190
	Shrub Grass	good	206
	Shrubland	good	333
	Dense Shrubland	good	155
	Riparian Forest	good	102

Invasive Plants and Noxious Weeds

Invasive plants, or weeds, interfere with the maintenance of healthy and diverse ecosystems and can degrade or destroy native plant communities, wildlife habitat, recreational opportunities, and agricultural use of the land. Weeds are a common problem throughout the Potholes Management Area and generally colonize and occupy sites that have been previously disturbed by fire, livestock grazing, motorized vehicular travel, and/or dispersed camping. Non-native plants can displace native plants and generally are of lower forage value to wildlife, livestock, and wildlife requisites such as cover and nesting habitat. They are difficult to control or eliminate once established, and generally colonize and occupy sites where the native plant community or ground cover has been lost or severely disturbed. Consequently, weed control is an integral part of any resource management program.

Noxious weeds are defined by the Washington State Noxious Weed Control Board (1999) as "non-native plants that are destructive, competitive, or difficult to control due to their aggressive growth and lack of natural enemies." These species are regulated by the Board and are categorized into three classes (A, B, and C) on the State Noxious Weed List. The categories are based on the seriousness of the threat they pose in the State. Class A weeds have the highest priority for control with eradication required by law, followed by Class B and C weeds. For species in any class, new infestations with limited distribution generally have the highest priority because the potential for contamination is greater than for more widely distributed species.

Class A weeds are those that are not yet abundant across the State, so the potential for eliminating them is high. Saltcedar or tamarisk (*Tamarix ramosissima*) is the only Class A weed known to occur at Potholes Reservoir. Because the Potholes environment is suitable for the establishment of saltcedar, a yearly monitoring "search and destroy" program is recommended by the Grant County Noxious Weed Board for this species. *Tamarix* spp. is discussed by Leonard (1996) as the species originally found at Potholes. However, species of this genus are notoriously difficult to identify and have confusing taxonomy and synonymy; it is best to assume that the species in question is the invasive, Class A species.

Class B weeds are limited to small portions of the State. The control emphasis is to prevent new infestations from becoming established in other parts of the State. The Class B weeds known to occur within the Potholes Management Area include kochia, purple loosestrife, puncture vine, perennial pepperweed, Eurasian water milfoil, Swainson pea, and the knapweeds (diffuse, spotted and Russian).

Because they are widespread, Class C weed control is dependent on the feasibility of control and the level of harm the weed poses locally. Class C weeds known to occur at Potholes Reservoir include Canada thistle and reed canary grass.

Weeds are associated with certain kinds of disturbance, plant communities, or land use activities that enhance their ability to proliferate. Roads, ORV travel, and dispersed camping are disturbance activities that promote the proliferation of Russian thistle, kochia, knapweeds, Dalmatian toadflax, and cheatgrass. Roads (vehicular travel) and recreationists function as weed dispersers and serve as vectors for introducing new weed species into new areas. This can be seen at staging areas or dispersed campsites. A typical scenario is the removal of vegetation through ground disturbance, bare soil exposure, and new weed seed deposition - creating ideal conditions for the establishment of a new weed population. Grazing promotes the proliferation of cheatgrass and knapweeds. The knapweeds are dispersed by cattle as the seed heads cling to animal fur. Reservoir fluctuations provide good conditions for purple loosestrife and cocklebur proliferation.

At present, purple loosestrife is firmly established throughout most of the Potholes Management Area; particularly thick stands have become established at the Winchester and Frenchman Hills Wasteway outlets. There is currently no reasonable control method for eliminating this species from areas where it has become established to the extent that has occurred at Potholes Reservoir. Herbicides (those approved for use near water) or hand removals are recommended for controlling individual plants and small populations only (Swearington, 1997). Biological control insects are seen as the most likely method of effective long term control of large populations (Swearington, 1997), due to the high cost and relatively ineffective results of herbicide application.

Cheatgrass, knapweeds, and Canada thistle are currently the most prolific weeds present at Potholes Reservoir regardless of the disturbance level. Canada thistle can invade any moderately wet site although it reaches higher densities in disturbed areas where it can easily outcompete native species. Canada thistle is a particularly difficult weed to control due to its vast underground root system (Whitson et al., 1999).

Weed invasion in wetlands is also a predominant problem. In general, weeds are more difficult to eradicate from wetlands because there are a limited number of herbicides that can be used near water. Also, wetlands often have dense vegetation with desirable native species having noxious weeds intermixed. Targeting only the weeds is sometimes impossible.

The proliferation of undesirable plants within the Potholes Management Area is managed through the integrated weed management program established between Reclamation, the State, and the Noxious Weed Control Board of Grant County. The various Reclamation and state issued land use agreements (i.e., grazing and agricultural leases) require the lessee, licensee or permittee to maintain a weed control program to prevent the spread or establishment of noxious weeds. Herbicides that are highly toxic to people, fish or wildlife are not allowed. Each entity is responsible for either taking appropriate weed control measures, or is required to reimburse the administering agency for any weed control costs incurred as a result of that entity's failure to control weeds on the involved property.

According to information obtained from the Noxious Weed Control Board of Grant County, the Potholes Management Area is monitored for weed control by the County, but treatment is administered by the WDFW and Reclamation. On occasion, subcontractors conduct the County's prescribed weed control measures. Reclamation is generally concerned with Eurasian water milfoil control because infestation is a source of propagules for other waters in eastern Washington (Reclamation, 1989). Current control measures and management techniques involve water level manipulation, mechanical control, herbicides, biological controls, and light-screening measures (Remaley, 1999). Mechanical control is effective only if all parts of the plant are removed. Light manipulation is done through bankside plantings, dyes, or shade barriers that block light to the plants. Water level manipulations up or down can also be used - raising the level "drowns" the plants by preventing light from reaching them

and lowering the level exposes the plants and roots to the elements. This technique is highly effective in controlling the plant, but has not eliminated it. Complete eradication does not appear to be practical, but one or some combination of these techniques may be the most effective.

3.2.8 Fish

Fish habitat at Potholes Reservoir is changing over time. Willows and water smartweed are increasing along the shoreline. These plants provide cover for fish from winter through early summer. Bulrushes and other emergent and aquatic plants provide cover and sites for insect eggs. When water levels drop in the summer, fish often must move to open water with less cover where they are more vulnerable to predation (McMahon and Bennett, 1996). A lack of available cover during low water levels could be a limiting factor for adult fish populations, particularly for black crappie and largemouth bass (Zook, 1978).

Beaver lodges provide considerable cover for fish, especially during low water levels. Zook (1978) has found up to one hundred bass at a single beaver lodge site. Beaver structures provide some of the limited cover at low water. Beaver numbers generally fluctuate depending upon annual trapping pressure, and their lodges break down quickly once abandoned. Fewer beavers means less structural cover for fish during low water.

Recreational users can affect shoreline habitats. In particular, personal watercraft (PWC), due to their low draft and internal water jet design, are able to travel into areas too shallow for other boats. When they jet around in these shallow and sometimes vegetated shoreline areas, their fast movement creates waves that disturb and erode shorelines, and they may uproot emergent plants and disturb submerged plants and shoreline animals like fish and aquatic insects. These watercraft can therefore have a detrimental effect on shoreline habitat, especially during low water levels (Field Observations by Jim Tabor, WDFW).

A biological fish survey was conducted in September, 1978 to collect age composition and growth data for major game species, and the relative abundance of all major fish species in the reservoir (Zook, 1978).

The most recent biological survey of fish at Potholes Reservoir was conducted September 11-21, 1978. The goal of the preliminary survey was to determine species composition, relative abundance of warmwater fishes, and age class and growth data for game fishes. Perch were the most abundant species, and carp were second in abundance (Zook, 1978). Other species found at Potholes were largemouth and smallmouth bass, bluegill, long-nose sucker, black crappie, pumpkinseed, sculpin, rainbow trout, brown bullhead, and walleye. The same fish species are present today, but the relative

abundances are no doubt considerably different than they were 22 years ago. For example, anglers at Potholes Reservoir have reported a substantial decline in the abundance of yellow perch.

Fish introduced into the Columbia River system have the potential to enter Potholes Reservoir from Moses Lake via the Crab Creek Arm. Most reservoir fish species were introduced into the Columbia River system in the late 1800's and early 1900's (Wydoski and Whitney, 1979).

Prior to the start of this RMP process, the last creel census was conducted in 1973-74. A stomach content analysis conducted on major game fish at the reservoir was completed in 1973 (Tate). Growth was considered average for perch and bluegill and higher than average in other eastern Washington waters for black crappie and largemouth bass.

The WDFW has stocked Potholes Reservoir with rainbow trout since 1959 (Zook, 1977). Approximately 100,000 to 150,000 trout have been stocked each year since the 1970's. Fish are generally stocked in the fall and measure 5-6 inches in length. To improve growth and recruitment, 60,000 trout were retained in net pens in 1996 for a spring release of trout in 1997, averaging 9-10 inches. Rather than stocking rainbow trout directly into the reservoir, these fish are transferred into net pens to enhance survival and growth before release into the reservoir. This net pen experiment appeared successful with trout making up the majority of fish caught at the reservoir through mid-July that year. More pens will likely be added until all 150,000 trout can be accommodated (Personal Communication with Jeff Korth, WDFW). Small numbers of walleye have also been stocked, but other reservoir fisheries are not maintained by stocking.

Fish predators in Potholes Reservoir include established predatory fish, birds, and humans. Walleye, bass, and bullheads are some of the main fish predators present. Walleye, first observed in the reservoir in 1973, continue to feed all year while other species slow down during cooler months. They feed heavily on yellow perch, bullheads, and sculpins (Wydoski and Whitney, 1979).

Some fish-eating bird populations, such as double-crested cormorants and great egrets, have increased in recent years. Cormorants have recently become one of the most abundant colony nesting, fish-eating birds at the reservoir. The number of cormorant nests surveyed increased from 30 nests in 1983 to 652 nests in 1997. The diet of cormorants may include yellow perch, bullheads, crappies, carp, and sunfishes. Other fish-eating birds found in large breeding colonies include grebes, gulls, terns, and herons. The Western grebe consumes carp, perch, bluegills, grasshoppers, mayflies, and beetles (Terres, 1995). Large flocks of white pelicans can sometimes be found foraging in the reservoir or wasteways in late summer. Many other fish-eating marsh and shorebirds migrate through the area in fall and spring. Overall, these breeding and migrating birds consume large numbers of juvenile and small adult fish.

Angling pressure by humans may also have an effect on fish populations. While most fish are released, fishing contests still may have an impact on target populations. Rough estimates of visitors from car counter data, field observations, and questionnaires show an increase from 130,000 anglers in 1981 to 245,915 anglers in 1995 (Columbia Basin Wildlife Area Use Report Data).

The Job Corps Dike effectively isolated the North Potholes portion of the reservoir from the main reservoir body. This enabled biologists to eliminate all carp and other fish in the northern area. Largemouth bass and bluegill were subsequently restocked in 1977. Soon after carp were removed, the density of aquatic plants, invertebrates, muskrat, waterfowl, and other wildlife increased dramatically and the water became visibly clearer (Zook, 1978, Field Observations by Jim Tabor, WDFW). Bass and bluegill reproduced and showed a higher initial growth rate than in the main reservoir (Zook, 1978).

Although the Potholes Reservoir remains a popular fishing area, experienced Potholes anglers claim that some game species like perch, bluegill, crappie, and even largemouth bass appear to be declining. While carp, bullhead, smallmouth bass, and walleye populations appear to be on the rise this decade. Many factors may be contributing to the apparent declines in some species, including interactions of predatory fish, fish-eating birds, increased carp abundance, changes in habitat structure, water quality changes, reservoir productivity, annual water level fluctuations, and reservoir management. Fish diseases or parasites could also be factors. No systematic studies have been conducted to identify causal factors.

Today the goals of fisheries management at Potholes Reservoir include maintaining game fish species diversity and abundance with an emphasis on warm water species, and maintaining and enhancing recreational fishing opportunities. Although rainbow trout stocking is currently a major component of fisheries management, it is of secondary importance to maintaining other desired fish like perch, walleye, bluegill, crappie, and bass.

3.2.9 Wildlife

Construction of O'Sullivan Dam caused dramatic vegetative community changes within the RMP boundary. Wetland emergent and riparian habitats increased at the expense of shrub-steppe. This change was beneficial to some wildlife species because it created extensive emergent wetland and riparian habitat in an area where it had been limited.

Dispersed recreation within the Potholes area has also altered the vegetative communities at Potholes. Unlike the vegetative changes caused by dam construction, dispersed recreation has had a negative impact on wildlife habitat within the RMP area.

Irrespective of any past or current impacts, Potholes Reservoir provides suitable habitat for several classes of common and sensitive terrestrial game and nongame wildlife species (Figures 3.2-3 and 3.2-4 "Wildlife Resources Map"). The diverse habitat types, ranging from exposed sand dunes to lush riparian forests, are utilized by numerous wildlife groups including: mammals, birds, reptiles, and amphibians. Descriptions of the wildlife that occurs at Potholes Reservoir are listed below by group. Sections may be further subdivided into descriptive categories such as "game" or "nongame" where appropriate.

Mammals

Big game species within the reservoir area include mule deer (*Odocoileus hemionus*) and white-tailed deer (*Odocoileus virginianus*). Mule deer are more common with a population approaching 300-400 individuals, including the Winchester and Frenchman Hills Wasteways. The mule deer population has increased in the past few years. Fawn/doe ratios climbed to 100 fawns per 100 does in 1996 from a ratio of about 15 fawns per 100 does in the past (Tabor, 1996).

White-tailed deer sightings are rare near the reservoir. The most recent sighting was recorded in October 1996 near Potholes State Park (Tabor, 1996).

Furbearing Species

Furbearers in the Potholes Management Area include beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), long-tailed weasel (*Mustela frenata*), badger (*Taxidea taxus*), striped skunk (*Mephitis mephitis*)(Tabor, 1996, Foster *et al*. 1982) and rabbits (black-tailed jackrabbit *Lepus californicus* and Nuttall's cottontail rabbit *Silvilagus nuttallii*). Potholes Reservoir is also considered a major concentration area for beavers (Foster *et al.*, 1982). Although no official surveys have been conducted to quantify beaver population size, incomplete counts and observations indicate that at least one hundred beaver colonies (approximately 500 beaver) populate the Potholes Management Area (Tabor, 1996). The highest beaver concentrations occur in the northern section of the Potholes Reservoir Management Area in the West Arm, North Potholes Reserve, the Dune/Sand Islands, and the Crab Creek Arm. These areas are comprised of numerous pothole wetlands with a mixture of tree and shrub willow cover. Wetland plant community composition and the presence of many ponded areas are closely related to the dam building activities of beaver. Beaver lodges are key habitat structures in Potholes Reservoir. They provide nurseries for fish when the water level drops and shoreline areas are no longer available for cover (Zook, 1978), perches for herons and other birds, and basking sites for western painted turtles.

R28E

5 SE

5 SE

"K" SE

"L" SE

"M" SE

T18N

T17N

6 SE

O'Sullivan Site - South

Washington Ground Squirrel

Washington Ground Squirrel

E. Lind Coulee Arm

W. Lind Coulee Arm

Caspian Tern

Viceroy

Sage Thrasher

W. Lind Coulee Boat Launch

Developed Corridor

Washington Ground Squirrel

Wildlife Resources
Potholes Reservoir Resource Management Plan

Boundaries
- RMP Study Area
- Management Areas

Roads
- Highway/Improved Roads
- Primitive (Closed)
- Primitive (Open)
- Gate

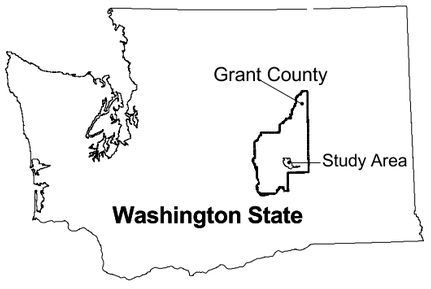
Priority Species
- Breeding Occurance
- Individual Occurance
- Regular Small Occurance

Shorebird and Waterfowl Concentrations
- Bald Eagle Wintering Habitat
- Waterfowl Breeding Concentrations
- Waterfowl Large Concentrations

N

Scale 1:30,000

0.4 0 0.4 0.8 Miles



Wildlife Resources
Potholes Reservoir RMP **Figure 3.2-4**

R27E R28E

North Potholes Reserve

Peninsula North

Peninsula South

Upper West Arm

Upper Crab Creek Arm

Lower Crab Creek Arm

Eastern Dunes

Eastern Bluffs

Dunes/Sand slands

Lower West rm

Main Reservoir

O'Sullivan Site - North

Potholes State Park

Developed Corridor

Mar Don Resort

Moses Lake

Burrowing Owl

Great Blue Heron
Black-Crowned Night-Heron

Western Grebe

Clark's Grebe
Western Grebe

Clark's Grebes

Clark's Grebe

Black-Crowned Night-Heron

North Outlet

South Outlet

Clark's Grebe
Western Grebe

Great Blue Heron
Forester's Tern
Great Egret

Double-crested Cormorant

Black-Crowned Night Heron

Great Blue Heron
Great Egret

Loggerhead Shrike

Sand Dunes Road

Power Line Road

Job Corps Dike
Boat Launch

CaspianTern

Western Grebes

California Gull
Ring-billed Gull
Caspian Tern

Long-Billed Curlew

Ring-billed Gull\Caspian Tern

Western Grebes
Clarks Grebes

Western Grebes

Western Grebes
Clarks Grebes

California Gull
Ring-billed Gull

orester'sTern Abandoned)

Forester'sTern

Forester'sTern

California Gull
Ring-billed Gull
Caspian Tern

Ring-billed Gull

Caspian Tern
Caspian Tern

Caspian Tern

Forester'sTern

Forester'sTern

Forester'sTern Abandoned)

Winchester Wasteway

Frenchman Hills Wasteway

Swainson's Hawk

BlackTern

Forester'sTern

Loggerhead Shrike

CaspianTern

Burrowing Owl
American
White Pelican

Grant County

Study Area

Washington State

Swainson's Hawk

262

T N

T N

Wildlife Resources
Potholes Reservoir RMP

Figure .2-

Boundaries
- RMP Study Area
- Management Areas

Roads
- Highway/Improved Roads
- Primitive (Closed)
- Primitive (Open)
- ORV Trails
- Gate

Misc. Improvements
- Dikes
- Powerline

Priority Species
- Breeding Occurence
- Individual Occurence
- Regular Small Concentration
- Nesting Colony

Shorebird and aterfowl Concentrations
- Shorebird Breeding Area
- Shorebird Large Concentrations
- American ite Pelican Regular Concentration
- Bald Eagle intering Habitat
- Burrowing Owl Breeding Occurrence
- Clark's Grebe Breeding Occurrence
- Great Blue Heron Breeding Occurrence
- Priority Habitat Island
- Western Grebe Breeding Occurrence
- Waterfowl Large Concentrations

Wildlife Resources

Potholes Reservoir Resource Management Plan

N

0.5 0 0.5 1 1.5 2 Miles

Nongame Species/Small Mammals

Pocket mice and pocket gophers are dominant species in sandy areas, and montane voles are abundant in association with moist sites. Washington ground squirrels are limited to the Lind Coulee Arm where soils are silt loam rather than sand. Several bat species are known to occur in the Potholes Management Area. However, the paucity, or shortage, of caves, rock outcrops, and mature trees limits bat roost sites in the reservoir area.

Birds

Upland game birds in the Potholes Management Area include ring-necked pheasants (*Phasianus colchicus*), California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), and gray partridge (*Perdix perdix*). Ring-necked pheasants are locally abundant in wetland and adjacent upland areas. In winter, they congregate under coyote willows in the East Lind Coulee Arm, and in Russian olive thickets (WDFW, 1997). Pheasants are hunted in all areas surrounding the reservoir. California quail are most abundant in the Potholes State Park and Crab Creek Arm, and a few quail are hunted along the West Arm each year. Mourning doves nest and winter in the dense wetland habitats surrounding the reservoir (Tabor, 1996). The gray partridge population is low but possibly increasing (Tabor, 1997).

Waterfowl

Potholes Reservoir is a major waterfowl hunting area of statewide importance. The North Potholes Reserve is located north of the Job Corps Dike and extends north to Interstate 90. No hunting or trapping is allowed in this reserve, which serves as a resting area for thousands of ducks and geese. During the hunting season the reserve promotes hunting on other parts of the reservoir by holding ducks in the area (Foster et al., 1984). The reserve also serves as an important Canada goose rearing area.

Canada geese in the Columbia Basin nest primarily on islands found within the reservoirs and other large water bodies of the region (Foster et al., 1984). At Potholes Reservoir, geese nest at the edges and on the highest points of the Sand Islands, on gull colony islands, on beaver lodges, and in trees also used by nesting herons.

The reservoir has limited high quality breeding habitat and food resources for ducks. Prime breeding and foraging habitat is found predominantly near carp-free waters along the reservoir perimeter. It has been hypothesized that the presence of carp reduces quality duck breeding and foraging habitat. For example, duck brood count numbers were relatively high for several species during a study conducted

prior to the construction of O'Sullivan Dam: coots (156 in 1950 and 180 in 1951), mallards (43 in 1950 and 58 in 1951), and blue-winged and/or cinnamon teal (40 in 1950 and 34 in 1951). However, waterfowl were not observed in pothole ponds with carp (Harris, 1954). More recently, the presence of carp in Columbia Basin ponds has been correlated with a lack of submergent vegetation, and significantly lower waterfowl abundances (Foster et al., 1984) than carp-free ponds for mallards, gadwalls, northern shovelers, cinnamon teal, blue-winged teal, American coot, ruddy duck, and redheads (Clement, 1980; Tabor, 1996).

Colonial Nesting Birds

Three areas are particularly conducive to colony nesting. North Potholes Reserve, the reservoir arms (West Arm, Job Corps, and Crab Creek Arm), and the Sand Islands collectively provide nesting habitat for all the colonial nesting birds that occur at the reservoir.

North Potholes Reserve

Many factors make the North Potholes Reserve ideal habitat for large colonial nesting birds. At the North Potholes Rookery, tall peachleaf willow stands loom above a complex of willow shrub, emergent, and open water wetlands. These willow trees, up to 50 feet tall, have matured since the 1970's to provide nesting habitat for black-crowned night herons, great blue herons, great egrets, and double-crested cormorants. The numerous ponds at this site and the reservoir supply these birds with food (i.e., fish and other aquatic organisms). Human disturbances within the reserve are minimal as motorized boats and automobiles are prohibited except in the vicinity of Job Corps Dike.

The Reserve has provided unique bird watching opportunities for many years. It contains the largest black-crowned night heron rookery and the first great egret breeding record in Washington state (Clement, 1980; Fitzner et al., 1979). In addition, three of the four main colony nesting birds here have State protective status as monitor species including the black-crowned night heron, great blue heron, and great egret. Breeding areas for all four species are considered priority habitats by the WDFW.

Reservoir Arms

The reservoir arms (West Arm, Job Corps, and Crab Creek Arm) are characterized by scattered tree willows, shrub willow dominated shorelines, and numerous ponds and islands bordered by emergent wetland vegetation. Black-crowned night herons and great blue herons have nested in relatively low

densities in Crab Creek rookeries. Fishing and PWC uses are sometimes concentrated in these arms (Finger and Tabor, 1997) especially at high water when access is not limited.

Sand Islands

Gulls and terns have nested on the Sand Islands since the 1950's (Harris and Yocom, 1952; Johnsgard, 1954). Islands selected by nesting gulls and terns are usually bare to sparsely vegetated with steppe grasses or shrubs. The shorelines may support willows and emergent plants. At Potholes Reservoir, these ground nesting birds scrape cup-shaped nests into the sand and line them with twigs and feathers (Finger and Tabor, 1997). Island colonies are very dynamic, with birds selecting different islands for nest sites, sometimes on a yearly basis.

The abandonment of entire island colonies appears to be relatively common at Potholes. Three out of five gull and tern colony islands containing approximately 673 ring-billed gull, 94 California gull, and 119 Caspian tern nests were abandoned a few weeks after Memorial Day 1997. After these abandonments another island colony was established. However, this newly established colony was also abandoned by June 23. In addition, two out of three Forester's tern island colonies were abandoned in 1997 (Finger and Tabor, 1997). It is not known whether the increase in human activity in the spring and summer contributes to the abandonment of nests and colonies.

Western Grebe - Grebe breeding areas are classified as priority habitat by the WDFW. Western grebe observations at Moses Lake and Potholes Reservoir date from the 1950's during early reservoir development (Harris and Yocom, 1952; Johnsgard, 1954). In 1997, the estimated number of western grebe breeding pairs was greater than 1,000, despite a large percentage of nest failures due to changing water levels, and wave action from boats and other water craft (Field Observations by Jim Tabor, WDFW). Grebes nested primarily in thick stands of bulrush in the Crab Creek Arm in the early 1990's (Tabor, 1997).

In 1997, western grebes nested along the West and Job Corps Arms, and Clark's grebes nested along the West Arm (see Figures 3.2-3 and 3.2-4 "Wildlife Resources Map"). There were 240 active western grebe nests, and at least 13 Clark's grebes nests. Nests were made of smartweed and bulrush. The first nests were observed on June 29 (Finger and Tabor, 1997). Grebes did not nest in the Crab Creek Arm in 1997.

Cormorant - The double-crested cormorant colony became established in the late 1970's. The colony has grown in recent years to become one of the largest fish-eating bird colonies in North Potholes Reserve. Before establishing nesting populations at Potholes, cormorants were noted as common migrants in the area (Johnsgard, 1954). In 1978, approximately 16 adult birds were observed in North

Potholes Reserve. By 1982, the cormorant population was very productive with at least 30 nests, each containing 3-4 young. The colony grew to approximately 425 nesting pairs in 1991. Nest production was high with many nests containing 4-5 young. Large numbers of non-breeding birds (up to 100 in 1983) were also using the reservoir (Friesz, 1997). In 1997, 652 nests were active with incubation in May and hatching in June (Finger and Tabor, 1997).

Double-crested cormorants are diving foragers rather than shallow water waders (Terres, 1995). The double-crested cormorant is presently one of the dominant fish-eating birds nesting in the tree willows. During the past ten years, the cormorant and egret colonies have had the highest growth rates of all of the colony nesting birds.

Other Water Birds and Shorebires

Water bird and shorebird breeding at Potholes Reservoir include sora rail, Virginia rail, American coot, killdeer, long-billed curlew, common snipe, and spotted sandpiper. Long-billed curlews nest in steppe grasslands and in high quality shrub-steppe habitat such as found within the Peninsula North, Peninsula South, and North Potholes Reserve Management Areas.

The white pelican is a state endangered species and is one of the more sought after birds by bird watchers. As such, the white pelican is a "high profile" species of concern at the reservoir. White pelicans are very opportunistic foragers and they will flock to areas with a rich supply of available fish. At Potholes Reservoir this supply of fish is most readily available when the water levels are low, causing fish to be restricted to pools where they are more vulnerable to predation. Significant numbers of white pelicans are present in the late summer and early fall, and in recent years their summer presence has increased. Counts of white pelicans have varied between 200 and 1,600 birds from 1978 to 1990 (WDFW, 1997). About 1,000 pelicans were observed in September 1996 foraging and resting in the wasteways. Part of the population is believed to be associated with the breeding colony of William Lake, B.C., estimated to be around 200-300 birds (Personal Communication with Jim Tabor, WDFW).

Reptiles

Sagebrush lizards (*Sceloporus graciosus)* are found in shrub-steppe habitats surrounding the reservoir. The Sand Islands and the uplands around the reservoir provide habitat for Northern sagebrush lizards, horned lizards (*Phrynosoma douglassii*), racers (*Coluber constrictor*), gopher snakes (*Pituophis catenifer*), and garter snakes (*Thamnophis spp*.). Painted turtles (*Chrysemys picta*) are abundant in the North Potholes Reserve and Crab Creek Arm. Painted turtles are often seen sunning themselves

on logs or hummocks in the pothole wetlands, and their tracks are often visible crossing the sandy ORV trails within the Lower Crab Creek Arm.

Although there are no known records of night snakes (*Hypsiglena troquata*) within the Potholes Management Area, habitat is available in basalt rocks at the southern end of the reservoir and in rodent burrows in the sandy soils found throughout the area. There is record of a night snake south of the West Lind Coulee Arm (WDFW, 1997).

Amphibians

Northern leopard frogs (*Rana pipiens*) are only known to occur in two Washington state locations. These most recent records are at Potholes Reservoir and in parts of Crab Creek north of Moses Lake. The Potholes Management Area's small, localized population is found in the Crab Creek Arm and North Potholes Reserve where they seem to prefer moist soil grown over with cockleburs during late summer and fall. Little is known about their breeding habits in this area (Friesz, 1997).

Tiger salamanders (*Ambystoma tigrinum*) are found in and near fish-free ponds along the Potholes Reservoir perimeter. They attach their eggs to submerged vegetation in shallow water where larva may take from one to two summers to metamorphose into terrestrial adults.

3.2.10 Threatened and Endangered Species

Information on federal and state special status plant and wildlife species in the Potholes Reservoir Management Area was obtained from databases maintained by the Washington Natural Heritage Program (WNHP) and USFWS. Included are those federally listed as Threatened or as "Species of Concern," and those with Endangered, Threatened, Sensitive or Review State status. In general, however, the presence or absence of a special status species at the site-specific location remains undetermined without additional field inventories.

Special Status Plant Species

Species with Federal Status

The WNHP indicated that there are no federally listed species known or suspected to occur in the project area (1996, 1999). However, the USFWS (March 29, 1999) included Ute ladies'-tresses (*Spiranthes diluvialis*) in their list of federally listed species that may occur at Potholes Reservoir.

The probability is very low that Ute ladies'-tresses occur in the Potholes Management Area due to the lack of appropriate habitat conditions. The USFWS (1998) states that Ute ladies'-tresses do not occur along slow meandering streams out in the flats - a good description of the streams near the Potholes Management Area. Most wetlands within the area are subject to long periods of inundation followed by severe drawdowns during the irrigation season, another condition specifically discussed by the USFWS as inappropriate. Lastly, the microclimates and elevations found at Potholes Reservoir are generally not conducive to the species.

Species with State Status

A Washington State Sensitive Species is defined by WNHP as "a species that is vulnerable or declining and could become Endangered or Threatened in the State without active management or removal of threats." According to the WNHP (WNHP, 1999), gray cryptantha (*Cryptantha leucophaea*), an upland forb and state sensitive species, occurs at one location in the Peninsula South management area and west of the Lower West Arm management area near the Winchester Wasteway. It typically grows in dry, often sandy places and is associated with rabbitbrush (*Chrysothamnus* spp.) and/or sagebrush (*Artemisia tridentata*) shrub communities and with cheatgrass (*Bromus tectorum*) and bluebunch wheatgrass (*Agropyron spicatum*) (WNHP, 1981). There is a large amount of this habitat type in the Potholes Management Area, though most of it is degraded. The cause of its rarity is unknown. Also, it is unknown how this species responds to disturbance.

Special Status Wildlife Species

Special status species are species that have been classified by the USFWS or WDFW as Threatened, Endangered, Species of Concern, or Monitor species.

Species with Federal Status

The bald eagle is the only federally listed Threatened species that occurs within the Potholes Management Area. There are no federal Endangered species listed within the overall management area since the de-listing of the peregrine falcon.

Individual adult bald eagles have been observed during the spring and summer months around the North Potholes rookery area in the last five years, leading to the speculation that at least one pair may be attempting to nest in the area. However, no nest has been found (Field Observations, WDFW).

The Washington ground squirrel is the only federally listed Candidate species within the Potholes Management Area.

Species with State Status

There are three State listed Endangered species (American white pelican, sandhill crane, and peregrine falcon) and two state listed Threatened species (Ferruginous hawk and bald eagle) that use the Potholes Management Area. In addition, there are nine State candidates for listing as Threatened and Endangered (western big-eared bat, Washington ground squirrel, common loon, western burrowing owl, sage thrasher, loggerhead shrike, sage sparrow, Columbia spotted frog, and northern leopard frog) and fifteen species on the state Monitor list (fringed myotis (bat), small-footed myotis, Kincaid's meadow vole, western grebe, Clark's grebe, Forster's tern, great blue heron, great egret, black-crowned night heron, black-necked stilt, long-billed curlew, prairie falcon, grasshopper sparrow, night snake, and tiger salamander).

Special Status Fish Species

No fish species with State or federal status (Endangered, Threatened, Species of Concern, or Monitor) are known to occur within the Potholes Management Area. However, State priority game fish including large and smallmouth bass, walleye, and rainbow trout are present.

3.3 CULTURAL RESOURCES SUMMARY

Cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archeological or scientific importance. There are several laws and regulations directing federal agencies to locate, identify, evaluate, preserve, protect and manage cultural resources significant to the nation's heritage and history, the focus of which, is the National Register of Historic Places.

3.3.1 Findings

A Class III cultural resource survey was conducted for the Potholes RMP area (36,200 acres) in 1999. Of the 18,597 acres of dry land, including islands, 13,235 acres were surveyed. The 5,362 acres not covered by on-the-ground reconnaissance were inaccessible. Ten sites, all dating to the historic era, were recorded, along with 44 isolated finds (Axton *et al,* 2000). Of the 44 isolated finds,

all but four also dated to the historic era. The four non-historic represented American Indian occupations. Thus the dominant human occupation of the Potholes vicinity, as determined by cultural resources surveys, relates to the post American Indian occupation, especially the 20th century. No cultural resources identified were deemed eligible for National Register consideration.

Were it not for the completion of Grand Coulee Dam in 1942 located in the north CBP, and the development of the vast agricultural potential of the Columbia Basin, the Potholes area would have likely remained the dry, sand-blown desert described by those who traveled through the region a century before. Because of both the importance to the success of the CBP, as well as meeting the minimum 50 year-old criterion, O'Sullivan Dam itself is potentially eligible for the National Register.

Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States for Indian Tribes or individuals. While most ITAs are on-reservation, they may also be found off-reservation. Examples of trust assets include lands, minerals, hunting and fishing rights, and water rights. Sometimes there is disagreement between the government and the tribes regarding what is considered to be an ITA, and who holds the right. This document does not judge the validity of rights claimed by any tribe.

The United States has a trust responsibility to protect and maintain rights reserved or granted to Indian Tribes or individuals by treaties, statutes and executive orders. This responsibility is sometimes further interpreted through court decisions and regulations. This trust responsibility requires that Federal agencies take reasonable actions to protect trust assets when administering programs under their control.

Findings

The Potholes Reservoir Management Area falls within the area ceded under the Treaty of 1855 in which rights to fishing and privileges for hunting and gathering of roots and berries were retained by the tribes signing the treaty.

While much of the Potholes Reservoir Management Area retains resources that support hunting, fishing and gathering activities, some areas may have been disturbed to the extent that they no longer can support such traditional uses. Currently, these activities are allowed throughout the Potholes Reservoir Management Area except that hunting is not permitted in Potholes State Park and in the North Potholes Reserve.

3.4 PALEONTOLOGICAL RESOURCE SUMMARY

The Columbia Basin basalts in the vicinity of Potholes Reservoir do not lend themselves to fossil preservation. Some vertebrates and invertebrates are occasionally reported in the area, but not with any frequency. Preserved plant species are present elsewhere in the Basin.

3.5 AESTHETIC RESOURCE SUMMARY

3.5.1 Visual

Fieldwork to inventory the scenic quality of the Potholes Management Area consisted of driving and hiking the area surrounding the reservoir as well as boating on Potholes Reservoir to qualitatively determine general visibility of the major landforms, recreation facilities, manmade structures, and reservoir-related facilities. In 1999, a visitor profile and recreational use study provided information on viewer sensitivity and key viewpoints. This information was presented in the Potholes Reservoir EIS and used to establish goals and objectives for visual resources.

Visual Character

Landscape character gives a geographic area its visual and cultural image, and consists of the physical, biological and cultural attributes that make each landscape identifiable or unique. (SMS, 1995). The upland landscape surrounding Potholes Reservoir is semi-arid and characterized by upland shrub-steppe cover types that include native shrubs and introduce annual grasses. Typically, these appear homogenous to the casual viewer and are not highly regarded. However, changes are more noticeable in this landscape type than in other more diverse landscapes.

Widely dispersed ranches, orchards, and farm operations are visible along the eastern boundary of the Potholes Reservoir Management Area. Riparian forest and riparian shrub cover types are common along reservoir and island shorelines, in natural drainages, and along wasteways. Wind breaks and shade trees are found in developed areas where they have been planted and irrigated. Sandy beaches, wind-blown dunes, and mudflats (at low water) characterize many of the undeveloped shoreline areas found around the reservoir. Most of the dispersed campsites have fire rings, and some are visually compromised each season by the presence of trash and human waste.

At Potholes Reservoir, sensitive viewpoints include travel routes (SR 262, SR 17 and Dodson Road). In addition, there is an established network of primitive dirt, sand or gravel surfaced roads visible throughout the Potholes Reservoir Management Area. Recreation sites and areas are also considered

sensitive view points at Potholes Reservoir. Most recreation users at Potholes Reservoir are boaters and campers who utilize the facilities in the Developed Corridor. These visitors expect developed amenities and modifications to the landscape. Visitors who camp at dispersed areas tend to prefer a more primitive experience and tend to be sensitive to changes in landscape character. The ORV Area experiences high use during the Memorial Weekend, but residual trash would suggest a general disregard for the visual quality of the area.

3.5.2 Noise

Noise (generally defined as undesirable sound) can be annoying to area visitors as well as wildlife. Unfortunately, the subjective effects of noise (annoyance, nuisance, dissatisfaction) cannot as yet be measured in any completely satisfactory way. This is primarily because of the wide variation in individual thresholds of annoyance and the habituation to noise of differing individuals due to their past experiences. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

The most sensitive noise receptors in the Potholes Reservoir Management Area are the existing developed recreation areas (Potholes State Park and Mar Don Resort) and important wildlife areas (Dunes/Sand Islands and North Pothole Reserve). Ambient sound levels throughout most of the Potholes Reservoir Management Area are generally rural to residential in nature. These ambient levels are affected by noise from vehicular traffic on nearby roads, motor boats and personal watercraft (jet skis) on the reservoir, and general recreational activities (ORVs), all of which exert a greater influence, individually and cumulatively, during seasonal peak-use periods.

The impacts of noise on colonial nesting birds, Neotropical Migratory Birds (NTMB), large and small mammals, and other wildlife species are not well understood. While various species probably adapt to some noise, the limits to the amount of adaption that can be made are not known. Although some species have little tolerance of noise (e.g., Canada geese) and others tolerate noise at very high levels (e.g., great egrets), noise can have other effects that are not readily apparent, such as relocation or prevention of mating and nesting behavior.

3.6 ECONOMIC AND SOCIAL RESOURCES SUMMARY

From 1930 to 1962, Grant County experienced rapid growth from 6,000 people to over 54,000. This increase was due mainly to the military installations and major construction projects dealing with the allocation and manipulation of the water resources. Since 1970, Grant County has had a relatively constant population showing only a slight overall increase. From 1989 to 1996, however, Office of

Financial Management figures show an increase to 66,400 ranking Grant County 17th in the State for population size.

Some population increases can be attributed to the migration of people from cities to rural communities. This commuting culture has created its own economic and ecological changes. For the Potholes area this mobility and desire for solitude has contributed to the influx of the recreating public. However, the majority of increase in population and changes to the Potholes and Grant County area is due to the introduction of water to several new irrigation blocks. This creates a "ripple" affect for the growth of small industry to accommodate the increased need for homes and home services. This was the case for the county leading up to the 1980's.

3.6.1 Economic Setting

Farming is the major industry in Grant County. The surrounding region produced 42 percent of the potatoes, 20 percent of the wheat, 54 percent of the sweet corn, 32 percent of the hay, and 43 percent of the peppermint in Washington state.

In 1993, one out of every four employees in the region was a farm worker. Statewide, less than 4 percent of all workers are farm workers. In Grant County there were over 5,700 farm workers. Employment rates vary greatly throughout the year and are directly related to the seasonality of farm work.

Farm income is the primary factor in the per capita average and reflects the relative volatility of farm income. Fifteen percent of Grant County income is farm related, compared with 1 percent statewide. Income distribution, measured by median household income, was $26,288 in Grant County, compared to a state median household income of $36,648 for 1992.

Grant County construction employment closely matches the State average of 5 percent. Manufacturing employment for Grant County and the State in 1993 was 17 percent and 15 percent, respectively. Seventy three percent of Grant County manufacturing is in food processing.

Since 1986, per capita income has been below the state and national averages. The national per capita income average in 1992 was $20,105. Grant County per capita income has remained relatively flat and below the state and national averages since the mid-1970's. In 1992, per capita income in Grant County was $16,289, 77 percent of the statewide average, and ranked 31st in the State.

3.6.2 Recreation/Visitation

In 1998 and 1999, "a visitor profile and recreational use survey" was conducted to gather information about visitor use and satisfaction, crowding, conflicts, recreation needs, as well as demographic and economic data pertinent to the Potholes Reservoir Management Area.

The recreation survey indicated that most Potholes Reservoir respondents were from the Puget Sound area, with 31 percent from the Seattle area. Fourteen percent of the respondents were locals from Grant County, 13 percent were from the Tacoma area, and 10 percent were from the Everett area.

About 35 percent of the respondents were return visitors, and 59 percent identified Potholes Reservoir as one of their favorite reservoirs to visit. Seventy-six percent of all users came to Potholes to be with friends, and about half of the respondents were satisfied with their trip. In support of their satisfaction, about half of the respondents would be willing to pay user fees from $1 to $10 per year. However, 26 percent indicated they were not willing to pay for facility use.

The average length of stay was five days. Twenty-three percent of respondents made arrangements and planned to stay at Potholes Reservoir one week to one month in advance of their visit. Thirty-three percent of the visitors have been coming to Potholes Reservoir for more than 10 years, 24 percent from 6 to 10 years, and 21 percent from 3 to 5 years. Thirty-four percent stayed in public dispersed camping areas and 26 percent camped at Potholes State Park. Nineteen percent of the respondents stayed at Mar Don Resort.

Overall survey use included camping (72 percent), fishing (63 percent), sunbathing (46 percent), and swimming (45 percent), however 36 percent of the survey respondents ranked fishing as the most important activity while 24 percent consider camping the most important recreation activity. Anglers ranked walleye and bass as the preferred catch, followed by trout and perch. Thirty-eight percent of the respondents used powerboats and 21 percent used PWC.

3.6.3 Solid Waste Management

Several sites surrounding Potholes Reservoir have been identified as areas where scattered litter is a common, recurring problem. To address this issue, establishing improved litter control procedures at each formal and informal day use and overnight site within the Potholes Reservoir Management Area should be a priority.

Establishing a reporting/monitoring system for litter control can include a monthly drive-by or visual site investigation of heavy use areas for loose trash, full trash receptacles, etc. Initial inspections should

record areas where receptacles need to be serviced more frequently, or problem locations where receptacles are not available (i.e., Sand Dunes and other informal camping areas). Monitoring results can direct where sanitation facilities and services should be improved or supplemented as necessary (i.e., during peak weekends). Discouraging trash dumping on public lands could be accomplished through educational programs, signage, brochures, increased monitoring, and/or law enforcement with strict penalty by Federal, State, and local officials. Adopting and encouraging "pack-in/pack-out" procedures and promoting the solid waste management survey program should be a priority in visitor brochures, and on appropriate signage.

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter describes the direct, indirect, and cumulative effects of the alternatives on the physical, biological, and human aspects of Potholes Reservoir.

The environmental effects section forms the scientific and analytic basis for the comparison of alternatives presented in Chapter 2. National Environmental Policy Act Regulations recognize three categories of effects:

- **Direct Effects** are caused by an action and occur at the same time and place.
- **Indirect Effects** are caused by an action, but occur at a later time or different place.
- **Residual Effects** are those effects remaining after application of proposed mitigation measures.
- **Cumulative Effects** result from the incremental impact of an action when added to other past, present, or future foreseeable actions, regardless of what agency or person undertakes the other actions.

Chapter 4 is organized by resource. Each resource will discuss these elements:

- Resource Title
- Introduction
- Issue Statement and Indicator
- Summary of effects
- Impact (direct and indirect effects) of the alternatives
- Mitigation
- Residual effects

4.1 AIR QUALITY

4.1.1 Introduction

Grant County is currently in attainment for all air quality standards (Seheibner, 1999). This impact assessment will disclose the short-term effects on air quality from construction and maintenance operations and recreation use. This assessment will use the following indicators to assess impacts to air quality:

Issue/Concern: The effects of development and maintenance operations on the quality of air within the Potholes project area.

Indicators:

- Compliance with criteria for the National Ambient Air Quality Standards
- Effect of recreational and management activities changes on emission standards

4.1.2 Summary of Effects

Since air pollution sources associated with each of the alternatives would be temporary, localized, and of small magnitude, no net adverse impact on air quality or ambient values in the Potholes area would occur. Overall, it is expected that diminished air quality during construction and maintenance operations and from visitor activities (e.g., campfires, fugitive dust, and internal combustion engine emissions) would have no effect on human health and would result in only a minor and temporary impairment in visibility and localized air quality.

4.1.3 Alternative A - No Action

Foreseeable management actions within the Potholes area (e.g., road maintenance operations, Potholes State Park campground expansion, and bicycle/pedestrian trail development from the O'Sullivan Dam to Potholes State Park) would temporarily increase localized fugitive dust and exhaust emissions. These emissions from heavy equipment operations would moderately increase short-term airborne pollutant levels in the immediate vicinity of the work. Ambient conditions existing prior to these activities would return once projects are completed. Anticipated impacts would be localized, short-term, and have little effect on the study area's overall air quality and ambient values. None of the expected emissions during project construction or routine maintenance operations would cause any significant adverse impacts to air quality and public health, or violate the National Ambient Air Quality Standards or criteria. Similarly, future emissions and air quality effects resulting from a general increase in recreation and other management activities are not projected to cause any significant air quality effects over the RMP's 10-year planning horizon.

4.1.4 Alternative B - Preferred

Construction-related emissions and long-term impacts would be similar to those described for Alternative A, but greater in extent due to the 80-acre expansion and facilities development at the O'Sullivan Site.
A net improvement in long-term, localized air quality conditions is expected from the permanent closure of 18.4 miles of primitive road to motor vehicle travel. These closures would reduce localized fugitive dust emissions during the area's long, dry recreation season (May through September). Similar to Alternative A, the air quality effects projected to occur under Alternative B would be localized and not violate the National Ambient Air Quality Standards or criteria.

4.1.5 Alternative C - Preservation/Enhancement

Air quality impacts associated with Alternative C would be similar to, but less in magnitude and extent, than those described for Alternative B. Under Alternative C, more of the primitive road network (24.8 miles) would be permanently closed to motorized travel, and few, if any, recreation or land development activities would occur. The anticipated net effect on air quality would be the least consequential of any of the alternatives considered. No significant unavoidable adverse impacts or cumulative effects would occur.

4.1.6 Alternative D - Recreation Development

Air quality impacts from Alternative D would be essentially the same as described for Alternative B. There would be no significant unavoidable adverse impacts and no significant cumulative air quality effects. Under Alternative D, about 13.0 miles of the primitive road network would be permanently closed to motorized travel, and more recreation facility amenities constructed and soil surfaces hardened than with the other alternatives.

4.1.7 Mitigation Measures

The Reclamation would require air quality control measures in construction specifications for any proposed development actions under all the alternatives. Standard measures would be required of contractors to reduce dust from construction operations and prevent it from damaging dwellings or causing a nuisance to people, using such measures as periodic wetting of exposed soils or roads where dust is generated by passing vehicles. Burning materials from clearing of trees and brush, combustible construction materials, and trash would be permitted only when

atmospheric conditions are considered favorable by appropriate state or local air pollution or fire authorities. Where open burning is permitted, burn piles would be constructed to reduce smoke, and under no circumstances would the contractor burn unapproved materials such as tires, plastics, rubber or asphalt products, or other materials that create heavy, black smoke or nuisance odors.

4.1.8 Residual Effects

The mitigation measure would serve to lessen the minor effects of short-term construction and maintenance operations. These measures are designed to ensure compliance with all laws, rules, regulations during implementation.

4.2 SOILS

4.2.1 Introduction

In order to determine the relative effects of the alternatives we identified certain vulnerable or distinctive soil properties. Changes to these properties by management action or inaction, were then used as indicators of both beneficial and adverse impacts. In many cases these indicators can be quantified, but in some cases, the modeled indicators are used for a qualitative estimate of relative impacts. The primary indicators of change are soil productivity loss or gain and soil disturbance. For the purpose of this analysis the term 'soil disturbance' will be used to describe the effects of the alternatives on soil productivity and physical properties. In this study, disturbed soils are defined as any soil that experiences a decline or gain in vegetation/litter cover, a change in root binding capability, an increase or decrease in erosion, alterations in compaction, and changes in bank failure frequency. Productive soils are defined as soils capable of growing habitat.

Soil disturbance at Potholes Reservoir stems primarily from erosion and compaction. The principal mechanisms contributing to these undesirable effects include motor vehicle travel and dispersed camping on unsuitable soils and/or terrain; abrupt changes in reservoir water levels; wave action due to wind and/or boating activity; livestock grazing; and ground disturbances. While uncharacteristic wildfires strip vegetation and expose the land surface to increased erosion, they are an infrequent factor. The impacts of these factors can be quantified and extrapolated into acres of disturbance and acres of productivity lost or gained. Furthermore, a qualitative comparison of alternatives is possible.

The most common cause of disturbed soils is erosion. Erosion of soils typically leads to an increase to the sediment load of adjacent air and water bodies. These impacts will be discussed in detail within the air quality and surface hydrology sections of this chapter.

Issue/Concern: Maintain shoreline stability and reduce upland soil losses, soil productivity losses, and disturbances.

Indicators:

Changes to soil productivity
Changes to soil erosion, disturbance, and compaction

4.2.2 Summary of Effects

A net positive impact due to an overall decrease in soil erosion within the study area is expected under any of the RMP action alternatives. Alternative C would have the greatest benefit, followed by Alternative B and D. Although some minor reduction in soil erosion may be realized under the no action alternative, continued net adverse impacts are expected since most surface disturbing activities and erosion factors would continue unabated.

4.2.3 Impacts Common to All Alternatives

Dispersed camping both seasonal and year-round will continue to cause soil disturbance and productivity losses. Similarly, resource damage including vegetation trampling and removal, barren ground, altered drainage patterns, and soil compaction and erosion would persist in areas of concentrated visitor use. Recreation leases will continue to promote soil compaction and loss of vegetation due to foot traffic. The 52 acres of agricultural leases will continue without any significant impact to soils. The increased foot and vehicle traffic, along with campground development that will accompany the Potholes State Park expansion will result in 11 acres of soil disturbance and lost soil productivity. Additionally, changes in the State Park have the potential for alteration of drainage patterns which could effect sediment transport and soil loss. Development of 1.7 miles of bicycle pedestrian trail will take about 1.7 acres out of soil productivity in addition to increasing erosion along that stretch of trail. The restriction of motorized travel and foot traffic to designated areas will aid in vegetation recovery and help to prevent further erosion. Footpath and ORV trail development limitations will assist in the recovery of disturbed soils and help to prevent new soil disturbance. The maintenance of an

erosion and sedimentation program will evaluate the success of soil management practices and make adjustments in practices to alleviate problems.

The construction projects forecast in these alternatives would have short and long-term effects on soils. Although the projects represent a permanent alteration to the existing soil structure at affected sites, soils brought into productivity would ensure that there would be no significant cumulative change (positive or negative) in the total acreage affected by erosion. Minor, short-term soil effects during construction (i.e., increased erosion on bare ground) would be minimized by adhering to Best Management Practices (BMPs).

4.2.4 Impacts Common to Alternatives A, B and D

Continued grazing levels without modification would result in additional disturbances such as soil compaction, mechanical disturbance of the soil surface by hoof action, vegetative degradation (including litter loss), and a general decrease in soil productivity. Soils will retain their suitability characteristics, but will lose productiveness. Without corrective action, such problems and impacts are expected to worsen as use levels rise or persist. Restriction of grazing to 600 AUMs within leased areas will limit these soil disturbances and in some cases return soil to productivity and/or lower erosion hazard.

4.2.5 Impacts Common to Alternatives B, C and D

Construction of courtesy docks, boat launch improvements, State Park Expansion, and sanitation improvements would have the short-term effect of increasing sediment discharge to local waters, increasing land or shoreline erosion in or near the construction sites, channel alterations, and introducing soil as dust to the air. These effects would be offset by directing future recreation activities to areas least likely to increase soil disturbance through shoreline erosion and compaction.

Portions of the primitive road system which traverse areas with unsuitable soils and/or slopes would be either improved (e.g., graded and/or graveled) or permanently/seasonally closed to motorized travel. Reductions in soil erosion, compaction, sediment transport, surface disturbance, and the associated loss of ground cover are expected to be commensurate with the extent and duration of the road closures (permanent or seasonal) and rehabilitation features included in these alternatives.

4.2.6 Alternative A - No Action

Without an RMP, the SPRC, WDFW, and/or the Reclamation would apply individual control measures to abate the most severe cases of erosion. However, with increased public use occurring over time throughout the study area, incremental soil losses, soil compaction, and surface disturbances in high-use areas are projected to rise. Soil impacts would continue to originate from ORV and concentrated visitor activity on study area lands, and vehicular travel on those portions of the primitive road system crossing unsuitable soils and/or slopes. In the absence of additional fencing, signs, road/site improvements and/or closure, increased soil resource degradation in the form of wind erosion, gully and rill erosion, bank erosion, productivity loss, and compaction would continue to occur. Approximately 90% of the ORV and visitor activity takes place on soil units with only slight to moderate erosion potentials. About 10% of the visitor use takes place on soils with moderate to high erosion potential (Figure 2.2-1, Table 3.2-1). Due to the soil distribution and composition, we see soil erosion as only a minor impact.

Erosion would continue to be substantial in areas where soils and slopes are unsuited for heavy public use or motor vehicle travel. Such activities in previously undisturbed areas would cause mechanical disturbance to the soil surface and destruction of the protective vegetative cover including vascular plants and soil stabilizing microbiotic soil crusts. These disturbances often lead to soil aggregate destruction and channel formation. The most heavily used primitive roads and trails are expected to widen and become more deeply moguled, braided and rutted as vehicle use levels rise. Soil compaction would further exacerbate the erosion problem by restricting the ability of surface water to infiltrate into the ground and inhibiting the movement of oxygen through the soil. These effects would add to the loss or declining health of vegetation.

The most severe soil resource effects are expected to continue on those portions of the open primitive road system (approximately 39.4 miles or about 4% of the study area) located within the ORV use area. Although some primitive roads with significant erosion problems may be closed, the absence of a comprehensive road closure and rehabilitation program would fail to abate the problem.

Overall, adverse soil resource effects are expected to accelerate in the high use areas of the RMP study area. Although some minor improvements are anticipated from the piecemeal road closures and recreation development features noted, only minor reductions are expected in the primary factors contributing to soil disturbance at Potholes Reservoir.

4.2.7 Alternative B Preferred

The most severe soil resource effects are expected to continue on those portions of the open primitive road system (approximately 40.4 miles) located within the ORV use area. Under the preferred alternative, limiting or eliminating soil disturbing activities and restoring disturbed areas will produce long-term beneficial effects. Each of the following actions would help decrease or minimize the current extent that productive soils are lost to erosion in the study area.

Following an erosion inventory and control program implementation, prioritized problem areas would be rehabilitated. A monitoring program would assess program results. These generalized actions will reduce erosion from areas with high potential and help to prevent future problems.

Bank and shoreline erosion control measures would limit shoreline retreat.

Limiting or eliminating motorized travel and recreation activities on soils that are sensitive to soil compaction have a high erosion potential or have existing erosion problems that will slow erosion and help prevent future erosion related problems.

Diverting foot traffic from sensitive habitat high use areas by providing water access via constructed trails or boardwalks and closing and restoring random trails, would allow vegetation recovery and erosion reduction.

Monitoring the success of soil conservation measures and adjusting specific methods and techniques employed when improvements are needed, will ensure that the program is success over the duration of the RMP.

4.2.8 Alternative C - Preservation/Enhancement

With an emphasis on natural resource conservation, Alternative C would facilitate the greatest reduction in the soil disturbance factors currently affecting the study area and result in the greatest improvement in soil productivity and stability. Severe soil resource effects are expected to continue on those portions of the open primitive road system (approximately 34.3 miles) located within the ORV use area. These effects would be offset by the rehabilitation of 7.8 miles of primitive roads.

4.2.9 Alternative D - Recreation Development

The most severe soil resource effects are expected to continue on those portions of the open primitive road system (approximately 45.8 miles) located within the ORV use area. The development of 3.1 miles of watchable wildlife trails will have the benefit of guiding visitors through areas of low soil impact. Building of a courtesy dock and the lunch improvements at Blythe Boat Launch, Powerline Boat Launch, and Job Corps Dike Boat Launch, will increase sediment discharge to local waters and air during construction. This is a short-term impact that will disappear shortly after construction ceases.

4.2.10 Mitigation Measures

During construction planting grasses, forbs, trees and shrubs or placement of riprap, sand bags, jute, sod, erosion mats, bale dikes, mulch, or excelsior blankets would be used, where appropriate to decrease erosion. Clearing schedules would be arranged to minimize the practical exposure of soils.

Final erosion control, site restoration, and Best Management Practices would be initiated as soon as an area is no longer needed for construction, stockpiling, or access.

4.2.11 Residual Effects

Short-term effects such as increased land or shoreline erosion in or near recreation sites would be minimized by adhering to Best Management Practices (BMPs) and implementation of mitigation measures during construction and maintenance operations.

4.3 WATER QUALITY

4.3.1 Introduction

Ground and surface water quality is a complex subject at Potholes Reservoir given its operational characteristics as an irrigation project and its primary source of supply (e.g., irrigation return flow). Water quality issues were generally expressed in relation to the effect on reservoir fisheries. Potential human health effects were linked to human waste and pesticide contamination. Some individuals were concerned with the safety of eating fish from the reservoir.

Issue/Concern: The effects of the addition of human waste, increased turbidity/sedimentation, water level fluctuation, and pesticide residues on the quality of ground and surface water.

Indicators:

Change in pesticide and human waste contaminant levels
Change in reservoir turbidity and sedimentation
Attainment of water quality standards and beneficial use designations

4.3.2 Summary of Effects

Minor effects from construction related projects can be expected for the ground and surface water quality. Current conditions in the Reservoir are within acceptable limits and are expected to stay as such. Overall, the net differences between the alternatives on ground water hydrology and function would be negligible and insignificant relative to the regional and shallow aquifer systems beneath the study area. Therefore, they would not contribute to the overall cumulative effects.

4.3.3 Surface Water Quality

Impacts Common to All Alternatives

Existing conditions indicate that Potholes Reservoir surface water falls within acceptable National Primary Drinking Water standards. None of the actions of the RMP would affect the surface water quality. With the exception of temporary minor increases in silt concentrations of waters near construction sites, the impacts or effects to surface water quality, caused by management actions are negligible for the duration of the RMP.

None of the alternatives would affect water temperature and turbidity. Samples over time have demonstrated little change in these parameters (Chapter 3, Water Quality). Future management of the reservoir would include monitoring practices to maintain beneficial uses of the water.

4.3.4 Ground Water Quality

Impacts Common to Alternatives A, B and D

Ground water quality might experience minor localized increases in total dissolved solids during construction. Ground water impacts associated with the campground expansion proposed at Potholes State Park is unknown at this time since the type of sewage treatment facility has yet to be defined. The installment of an individual septic system present a potential minor impact if discharge into the shallow aquifer occurs. However, it is safe to assume that whatever facility is authorized for construction would meet the state's pollution control criteria and ground water protection standards.

Because ground water quality is directly affected by flow and recharge rates, it is expected that minor beneficial impacts would occur for the same reasons stated in the ground water hydrology section for these alternatives. With regional aquifer quality primarily affected by plateau-wide farming practices, adverse and beneficial impacts within the study area would be negligible.

Alternative A - No Action

Future resource management actions under Alternative A are not likely to influence ground water quality in the study area since the above factors would remain essentially unchanged. However, as a GWMA, Grant County and the Washington Department of Health would continue to monitor public water supply wells for nitrates. This data would be used to determine the need for additional BMPs especially in relation to regional agricultural operations. The Reclamation, the SPRC, and WDFW would insure actions developed through the "Ground Water Management Area" process are incorporated, where appropriate, into Potholes Reservoir management.

Alternative C - Preservation/Enhancement

Although small, the greatest benefit to groundwater quality would be realized under Alternative C. With the most primitive road revegetated and rehabilitated, many of the adverse effects of the primitive road network would be avoided.

Mitigation Measures

Expansion of the reservoir water quality and sediment sampling program to review the need for routine testing of fish flesh for concentration of contaminates from pesticides and heavy metals, and minimize chemical mosquito control methods.

Residual Effects

Due to the dominance of regional controls on the groundwater quality of the Potholes Reservoir RMP study area, the net or residual impacts expected would be negligible. Continued monitoring of the project would allow for water quality compliance.

4.4 VEGETATION

4.4.1 Introduction

Land use activities that are damaging vegetation and contributing to an increase in noxious weeds include dispersed recreation (primarily camping), motorized travel (particularly ORV riding), and to a lesser extent, livestock grazing. Other factors that add to the problem are, shoreline retreat due to wave action, reservoir fluctuations, and wildfire. Since impacts to soil and vegetation is often linked, many impacts previously discussed in the soil section (Section 4.2) will not be repeated here.

There are several basic actions that vary by alternative that would directly and indirectly, individually and cumulatively affect vegetation. They include site-specific campground and associated facility development; changes in ORV use, dispersed camping, and livestock grazing management; primitive road closures; and other recreation and resource-related actions. Several RMP actions are specifically tailored to restore or rehabilitate degraded habitats, curtail soil erosion and habitat disturbance, the spread of noxious weeds, and protect sensitive plants.

Each alternative includes actions that involve the development or more intensive use of currently disturbed or undisturbed landscapes. The direct impacts on vegetation associated with each of these actions would depend on existing site conditions.

To eliminate redundancy, the general impacts associated with the basic management actions and land use activities being considered are described first. This is followed by a discussion of the impacts common to all the alternatives prior to discussing the specific impacts expected with

each alternative. The alternative-specific impact assessments focus their attention primarily on the following four indicators:

Issue/Concern: Protect or enhance as part of the natural landscape, including special status plant habitat. Control noxious weeds throughout the project area.

Indicators:

Change in plant community abundance and composition
Change in noxious weed proliferation

4.4.2 Summary of Effects

Net positive impacts on vegetation are expected under each of the RMP alternatives. The greatest vegetation benefits would be realized under Alternative C, followed by Alternatives B and D, respectively. Alternatives B is expected to have a greater net beneficial effect than D due to a higher level of control, over uncontrolled dispersed camping, a higher level of habitat protection due to HMA designation, and the closure of a portion of the Yellow Zone to ORV use. Alternative C would have the greatest level of protection from the level of habitat protection.

4.4.3 Impacts Common to All Alternatives

Some management actions would occur regardless of the alternative selected. These actions and their anticipated effect on vegetation include the following:

Campground and Associated Facility Development

Campground and associated recreation facility development results in the direct loss of individual plants and habitat beneath the developed footprint. The severity of the direct and indirect effect, however, depends on the quantity and quality of the plant communities affected. If facility development occurs in an area that is already severely degraded or impacted, such developments can be an appropriate land use and may draw recreation users away from other, less disturbed areas. However, the opposite is true if the development occurs in an area of high habitat quality or impacts special status species habitat. Overall, the magnitude of the direct and indirect effects will depend on the location of the developed footprint involved.

Under all of the alternatives, a campground expansion would be authorized within Potholes State Park. Based on the developed footprint identified by the SPRC (see Figure 2-3, "Concept Plan for Potholes State Park"), a direct loss of approximately 11 acres of good condition shrub-steppe habitat would be permanently lost or replaced beneath the developed footprint. The cover types that would be lost include an estimated 9.7 acres of quality dense shrubland, 0.2 acres of shrub grass, and 0.5 acres of shrubland. These native cover types would be replaced with a manicured landscape typical of a state park setting. Open grassy areas and non-native ornamental shade trees would dominate the 11-acre campground expansion area.

Off Road Vehicle (ORV) Riding

Effects of ORV riding at Potholes Reservoir have been inventoried and observed in the study area and similar habitat types. Overall, areas with ORV use have lower cryptogam and vegetative litter percentages and higher percentages of bare ground or weeds than areas with no ORV use. The highest amount of bare ground (exposed) was in the Green Zone and the lowest in the control area (no ORV use). Shrub height did not appear to vary among areas. Similar studies within the area substantiate this conclusion(Cooke *et al.* 1997), (USFWS 2000).

Year-round ORV use within the Green Zone has led to fragmented patches of upland vegetation in dune troughs, an inability of native plant communities to recover due to continued disturbance and the overall conversion of shrub-steppe cover types to exposed, active sand dunes.

Study results within the Yellow Zone have shown a reduction in the shrub grass cover type coupled with an increase in grasslands dominated by noxious weeds and other non-native annual grasses and forbs. In addition, wetland areas generally have a higher percentage of weeds and are of lower habitat quality compared to similar areas without ORV use. Wetland perimeters in this heavily potholed area are also impacted by the direct loss of riparian and wetland plants from ORV activity. Indirect adverse effects occur as soil is lost through wind erosion and deposited on the plants and cryptogamic crusts adjacent to the ORV trails. All of the alternatives would have varying degrees of effects from ORV use. It should be noted that the "green," "yellow" and "red" zone have distinctively different types of habitat, successional pathways, and recovery ability. The existing condition outlined in Chapter 3 established the baseline for each of these areas.

Dispersed Recreation

This activity directly impacts vegetation from soil compaction and the loss of individual plants from trampling, firewood gathering, and vehicular travel within or adjacent to the dispersed site. Indirect impacts following ground disturbance typically include weed colonization or proliferation, which exacerbates the fire hazard potential, particularly in shrub-steppe and grassland areas. Campers can disburse weed seeds as they move from site to site, or they can introduce new weeds from areas outside the study area onto newly exposed bare ground. High use areas are more difficult to restore/revegetate without some site preparation due to soil compaction and previous weed establishment. Overall, wherever dispersed camping occurs, the net effect is a further degradation in plant community structure and composition due to weed proliferation, increased bare ground and plant damage, and a slow but continued reduction in the native cover types present due to a direct loss of plant cover.

The continued management of the Dunes/Sand Islands management area for dispersed recreation, without any recreation facility improvements or sanitation facilities to accommodate use, is the management approach being considered under all of the alternatives. Although unquantifiable, a continued net loss in the two dominant cover types present (fair to good condition riparian shrub and fair condition grassland) would occur from increased human/recreation use within the management area. The extent of this loss, however, would be less under the RMP alternatives due to WDFW's ability to close individual islands or campsites for resource protection or site rehabilitation purposes.

Livestock Grazing

Livestock grazing at Potholes Reservoir is a source of annual disturbance. The effect of grazing (positive or adverse) depends on the season and length of use, stocking level, range condition, and the vegetation communities present. Vegetation is directly impacted through trampling, herbivory, and alteration of the soil chemistry and productivity. Often, exotic annuals invade following disturbance. These annuals have the capacity and propensity to out compete the native bunch grasses and shrubs present causing the plant community structure and composition to become dominated by fire-prone species, such as cheatgrass - a tenacious annual of little value to wildlife or livestock. This annual grassland is then maintained by periodic wildfire, continued disturbance, and the slow exclusion of native species through competition.

At Potholes, the existing grazing permit program administered by the WDFW is limited to one permit that involves a two pasture grazing system. The smaller 700-acre pasture has been planted with crested wheatgrass and heavily invaded by weeds. Continued grazing in this pasture

from mid-March to April 15 will not result in any major additional loss in native cover types since the area has already been converted to plant communities dominated by weeds and non-native perennial grasses.

The larger 6,700-acre pasture occupies good to excellent condition shrubland, shrub grass, and riparian forest cover types. Under the existing grazing regime, a light winter and early spring grazing treatment from November 1 to mid-March is used to improve the perennial bunchgrass component of the native shrub-steppe communities present. Field observations identified a modest amount of cheatgrass invasion in the perennial grass component. Continuing the grazing program is not expected to result in large positive or negative long-term effects on the cover types present. Although some individual plants would continue to be lost by livestock trampling and herbivory, the greatest long-term threat requiring careful monitoring is whether the presence of cheatgrass and state-listed noxious weeds is expanding and adversely affecting the structure and composition of the high quality native plant communities present. All Alternatives except Alternative C would have these elements of grazing.

Primitive Road Closures

The 60.3-mile-long primitive road network at Potholes Reservoir serves as a primary conduit for weed introduction and dispersal. Those portions of the primitive road network open seasonally or year-round to motor vehicle travel will continue to provide a source for weed proliferation and increased fire potential, and represents a long-term loss in vegetative/soil productivity along the travel corridor. For those road segments permanently closed (miles of closure will vary by alternative) and revegetated, a net gain in native vegetation would likely be realized.

Other Management Actions

Impacts from watchable wildlife turnouts, trails, and interpretive displays would be similar to those outlined under "Campground and Associated Facility Development" with the intensity and context of the impact depending on facility locale. Because watchable wildlife areas tend to be placed within or near areas of high habitat value and wildlife use, the extent and nature of the disturbances introduced, coupled with the quality of the habitats affected, will determine the severity of the anticipated effect. Also, problems may arise from new trail development in previously undisturbed areas due to the introduction and dispersal of weeds and further habitat fragmentation.

The construction of a 1.7-mile-long asphalt-surfaced bicycle/pedestrian trail between the Mar Don Resort and Potholes State Park would result in the direct loss of approximately 2.5 acres of shrub-steppe habitat. Although the exact route for this facility is unknown at this time, a review of the cover types present in the area show that the greatest impact would involve shrubland, followed by the dense shrubland and very dense shrubland cover types. All these shrub-steppe cover types are currently in good to excellent condition and consist primarily of native species; few weed infestations are present. Impacts to the riparian forest and deciduous woodland cover types found along the reservoir shoreline would not be affected since the trail would avoid traversing these areas.

Two watchable wildlife areas would be developed under all of the alternatives being considered. In conjunction with the "North Potholes Vehicle Route" (see Figure 2-2.1), no direct adverse vegetative losses or additional weed infestations are expected since the concept involves an interpretive motor vehicle-based interpretive trail with stops at existing turnouts and developed sites. If short loop trails are developed at selected turnouts, however, a direct loss in vegetation would occur beneath the developed footprint involved.

A second watchable wildlife area would be established within the North Arm of the East Lind Coulee Arm management area (see Figure 2-2.2). The concept here involves vehicle turnouts and short trails with blinds for viewing waterfowl and other shorebirds. Numerous turnouts, primitive roads and campsites already exist in shoreline and interior areas. Consequently, the net effect on vegetation from the watchable wildlife features being considered would be negligible.

Collectively and indirectly, the watchable wildlife program should help reduce adverse vegetative effects in other reservoir areas. Through the use of interpretive signs and brochures, the public would be educated about the fragility of the Potholes high desert environment as well as the noxious weed problems and issues which effect the area's ecology and natural resources. Also, by focusing watchable wildlife activities within specific sites, the formation of unplanned "social" trails in sensitive shoreline areas may be curtailed.

Trail construction would result in further fragmentation of the native shrub communities present, but may prevent the proliferation of "social" unplanned trails, particularly in sensitive shoreline riparian and wetland areas.

Reservoir operations would continue to cause average water level fluctuations of 20 feet to occur on an annual basis. Shoreline erosion caused by these fluctuations coupled with wave action from boats and wind would continue to cause additional losses in shoreline vegetation where site-specific measures are not taken to stabilize erosion-prone areas. The effects of large

drawdowns include a decrease in the overall amount and diversity of shoreline vegetation, as well as aquatic vegetation in shallow areas.

Approximately 52 acres located along the north boundary of the East and West Lind Coulee Arm management areas would continue to be managed under WDFW's agricultural lease program. The six leases require the production of food and cover for wildlife, and, consequently, represent a commitment of soil resources for agricultural production rather than upland shrub-steppe cover types. With respect to the agricultural tract located in the Eastern Bluffs management area, depending upon the outcome of this potential trespass violation, the estimated 29 acres of cropland involved would either be managed under the agricultural lease program or terminated and reverted back to upland plant communities.

Table 4.4-1 compares by alternative the management actions and land use changes being considered that would result in direct vegetative effects - both beneficial or adverse. The comparison is based on an estimate of the land acreages involved.

Table 4.4-1
Effects of Alternatives on Vegetation
Potholes Reservoir, Washington

Land Use Activity	Alternatives (units in acres)			
	A	B	C	D
Expand Potholes State Park	11	11	11	11
Develop O'Sullivan Site-North as unit of Potholes State Park	0	80	0	80
Authorize for ORV riding (Grant County ORV Area)	3,354	2,435	1,227	1,932
Open to dispersed camping (year-round or seasonally)	14,753	12,595 [1/]	6,164	13,948 [1/]
Closed to dispersed camping (except in designated areas)	3,831	6,529	12,420	4,636
Continue WDFW livestock grazing permit program	7,400	7,400	0	7,400
Close portion of primitive road network to motorized travel [2/]	0	1	10	0
Revegetate portion of primitive road network permanently closed to motorized travel	0	0	11	0
Reopen or provide additional primitive roads/trails for year-round motor vehicle and/or ORV travel	0	1.5	0	9.5 [3/]
Develop a bicycle/pedestrian trail in Developed Corridor	2.5	2.5	2.5	2.5

Table 4.4-1
Effects of Alternatives on Vegetation
Potholes Reservoir, Washington

Land Use Activity	Alternatives (units in acres)			
	A	B	C	D
Develop West Lake/North Outlet Watchable Wildlife Trail	0	0.3	0.3	0.3
Develop Potholes State Park/Winchester Wasteway Watchable Wildlife Trail	0	0	0	1.9
Designate as HMAs [4/]	0	3,396	7,166	1,964
Continue WDFW agricultural lease program	52	52	52	52

1/ The 55-acre O'Sullivan Site-South would be closed to dispersed camping when O'Sullivan Site-North is developed as a unit of Potholes State Park.
2/ Change compared to present conditions.
3/ Change compared to present conditions: includes 1.7 miles (2.5 acres) of the Powerline Road currently open seasonally from July 1 to October 1; 2 miles (3 acres) of ORV access routes through closed areas; and 2.7 miles (4 acres)of currently closed road reopened in the East Lind Coulee Arm.
4/ Estimate of land area only.

4.4.4 Alternative A - No Action

Regardless of the alternative selected, future public use and recreation within the study area will continue to rise. Along with this predicted increase in public use, increases in the number and aerial extent of ORV trails, dispersed campsites, and other general disturbance factors (i.e., soil compaction, erosion, firewood gathering, unauthorized cross-country travel, etc.) would increase and continue to adversely impact the plant communities and cover types present. These impacts would be concentrated in dispersed camping areas along the reservoir shoreline, within the 3,354-acre ORV area, and along the 42.6-mile primitive road network which would be left open to motorized travel.

In the absence of a RMP, a slow, continued decline in the amount and quality of the vegetative cover types present would occur along with the continued conversion of these cover types to exposed soil (bare ground). These effects would primarily stem from the establishment or expansion of dispersed camping areas, roads, and ORV trails into adjacent terrain. These disturbances would result in further noxious weed infestations, a continued decline in plant community structure and composition, and individual plant damage or loss.

With the continued loss of cryptogamic crusts and the exposure of bare ground, annual and noxious weeds would continue to invade and become established in areas heavily impacted by human or animal use. The most severe effects on vegetation are expected in the same areas where high soil and vegetation impacts are already occurring from dispersed ORV use and camping. These heavy public use areas primarily include the Grant County ORV area as well as popular dispersed camping areas located in the West Lind Coulee Arm, O'Sullivan Site-North (O'Sullivan Beach/Perch Point), at the North and South Outlets, along the west shore of Moses Lake, and at Job Corps Dike.

Off-Road Vehicle (ORV) Riding

The Grant County ORV area authorized for ORV riding/motor vehicle travel would continue to encompass a total of 3,354 acres. Within the study area, about 1,459 acres would remain "open seasonally" within the Yellow Zone and 668 acres "open year-round" within the Green Zone. The adverse vegetative effects and trends previously described for ORV riding would continue within these two ORV management zones.

The anticipated net effect would be an increased loss in the vegetative cover types present and their continued conversion to exposed bare ground and active sand dunes. Although it is impossible to predict and quantify what the actual extent of this loss and conversion process would be in future years, the existing data indicates that progressively more bare ground would become exposed as the remaining poor condition shrubland and shrub grass cover types are lost and converted within the Green Zone to active sand dunes. Similar Yellow Zone effects can be expected, with decreases occurring in the amount of ground cover and cryptogams present; the greatest declines are expected in the shrubland and riparian shrub cover types. However, because of the fluctuation of the reservoir and the successional trends of this area vegetation loss would not be to the extent of the "green" zone.

An increased proliferation in the number of weeds present would occur adjacent to any new ORV trail created. With a continued increase in weed diversity and abundance, the quality of the cover types present would further decline as the plant community composition continues to shift from native species to non-native weed species and other annuals.

Fencing the boundary between the Yellow and Green Zones would reduce unauthorized ORV entry into the Yellow Zone during ORV closure periods. This action would help to curb the rate that the adverse vegetative effects of random trail construction, identified above, would occur. However, the long-term net effect within the Yellow Zone would remain essentially the same as described, but occur at a slower rate.

Dispersed Camping

Excluding the Developed Corridor and North Potholes Reserve where dispersed camping opportunities are limited, an estimated 14,753 acres would remain open to uncontrolled dispersed camping under this alternative (see Figures 2-2.1 and 2-2.2). Where dispersed camping occurs, the direct and indirect adverse vegetative effects and trends previously described would increase as public use and dispersed camping levels continue to rise. Although it is impossible to specifically identify and quantify what the future net effect on area vegetation would be from dispersed camping, based on the field inventory data gathered, continued and increased dispersed use throughout the area would further degrade plant community structure and composition and slowly reduce the native cover types present.

Livestock Grazing

WDFW's grazing permit program would continue on 7,400 acres without any major modification. The vegetative effects of continuing grazing permit TP-01 would continue as described in effects common to all. Direct impacts on vegetation through trampling, herbivory, and soil chemistry and productivity alterations would continue to occur on a seasonal basis. The presence and abundance of cheatgrass and state-listed noxious weeds are expected to slowly rise within the permit area.

Primitive Road Closures

No specific primitive road closures would occur under the No Action alternative. However, eliminating roads in wetlands and other environmentally sensitive areas (17.7 miles) would prevent further degradation of the vegetative cover types and plant communities present, allow plant community restoration to occur, and serve to curb the proliferation of weeds in these sensitive habitats. The adverse vegetative effects associated with continued public use and motorized travel would occur along an estimated 42.6 miles of primitive road open year-round or seasonally.

Other Management Actions

Noxious weed control would continue to be handled under the weed control program currently in place. Periodic Eurasian water milfoil infestations would continue to be controlled by the annual fluctuations and drawdowns associated with the operation of Potholes Reservoir as an irrigation supply for southern CBP lands.

Failure to rehabilitate heavily disturbed sites with an active and ongoing revegetation program using native plants and seeds could have the effect of providing favorable conditions for the invasion of exotic plants and noxious weeds that flourish in disturbed sites around Potholes Reservoir. Although some severely damaged areas may be rehabilitated, the lack of a comprehensive program to tackle this problem would result in only small landscape level benefits.

4.4.5 Impacts Common to Alternatives B, C, and D

All of the RMP alternatives (B, C, and D) include measures to abate some of the problems and factors adversely affecting vegetation at Potholes Reservoir. Regardless of the RMP alternative chosen, several management actions would be altered or introduced to minimize or reduce impacts on vegetation and associated natural resources.

Dispersed Camping

Disturbances associated with dispersed recreation and camping can have an adverse impact on vegetation through the introduction of weeds, the loss of native plants and cryptogamic crusts, and long-term changes in plant community structure and composition caused by ground disturbance and trampling. With a coordinated program to better control and manage dispersed recreation and camping throughout the study area, the extent that weeds would become established in new areas and individual plants lost or damaged is expected to be reduced in proportion to the degree dispersed use is controlled and directed to environmentally suitable areas. Dispersed camping areas are notorious for being noxious weed introduction sites or expansion sites for existing weed populations. Because recreationists tend to establish their campsites near water, other beneficial effects include a reduction in the loss of riparian shrub and riparian forest habitats.

Primitive Road Closures

There are between 0.7 and 6.8 miles, or approximately between one and 10 acres of primitive road, respectively, that would be permanently closed to public use depending on the RMP alternative chosen in addition to the roads closed within the wetland areas (17.7). These closures would likely result in a short-term increase in disturbance-oriented weeds, such as kochia (*Kochia scoparia*) and Russian thistle (*Salsola kali*), as they colonize the roadbed corridor. However, since these weeds would probably not expand beyond the disturbed corridor, gradually other species (including natives) would become established and lead to progressive vegetative recovery and soil stabilization. Coupled with rehabilitation efforts, such as seeding and soil aeration to reduce compaction, the process can be facilitated and noxious weed's establishment lessened. These closures would also help prevent the further loss of native species from unauthorized cross-county travel outside the established road corridor and subsequent weed introduction into adjacent terrain.

Other Management Actions

Though designed to prevent the loss of soil resources, an integrated erosion inventory and control program would also result in beneficial effects on vegetation since it would curtail the loss of upland and shoreline vegetation. Revegetation (seeding native grasses and forbs and planting native woody species beneficial to wildlife) is also planned to occur in areas severely degraded by the land use activities terminated under each alternative. Private efforts to plant vegetation would also receive a higher emphasis and accelerate the vegetation enhancement or rehabilitation process.

Collectively, the soil conservation, vegetation, and weed control measures being considered would increase the number of acres occupied by native cover types and plant communities, and decrease the rate adverse changes occur to plant community composition and structure. With active restoration efforts, the long-term proliferation and expansion of weeds are expected to decline as native species slowly out compete and replace the weed species present. On a landscape scale, the cumulative effect of the RMP management actions being considered should result in a net long-term improvement in native cover type condition and acreage.

Improved maintenance and enhancement of the diking system located in the North Potholes Reserve, Upper Crab Creek, and Upper West Arm management areas would improve the health and vigor of the water-dependent riparian and wetland habitats present. By reducing the amount of exposed sediment and mudflat substrate available for colonization, the presence and proliferation of cockleburs, Canada thistle, and other annual forbs and weeds would be reduced.

With an increase in the amount and availability of water, adjacent riparian and wetland communities would be healthier and more vigorous due to reduced stress from drought and enhanced growth rates.

The designation of HMAs would result in additional protection and enhancement opportunities for vegetation resources. The extent and magnitude of these positive vegetative effects are expected to be in direct proportion to the total acreage affected by HMA designation. Over time, the general management strategies and actions that would apply to HMAs would improve plant community abundance, condition, species composition and structure; reduce the rate weeds are either introduced or proliferate; and protect special status plants and their habitat.

With respect to seasonal restrictions on watercraft speed or a general prohibition on motorized watercraft within selected reservoir areas, the net effect on vegetation resources would be a reduction in wave action-related shoreline erosion and vegetative losses. Vegetative losses and damage associated with boat launching and associated shoreline use would also be reduced where these watercraft restrictions apply. The greatest benefit would be realized in the riparian cover types found along the reservoir shoreline.

4.4.6 Alternative B - Preferred

The management actions included in the Preferred Alternative would have an overall beneficial impact on vegetation and ecological conditions throughout the study area. Site-specific actions are discussed below. On a landscape scale, the cumulative beneficial impacts expected would exceed the localized adverse impacts identified.

In addition to the impacts identified and described in Section 4.4.3, "Impacts Common to All Alternatives" and Section 4.4.5, Impacts Common to Alternatives B, C and D, Alternative B would have the following vegetation effects.

Campground and Associated Facility Development

The development of the O'Sullivan Site-North management area as a full service campground and day use area would be authorized. Based on the developed footprint identified by the SPRC (see Figure 2-5, "Concept Plan for O'Sullivan Site - North"), a direct loss of approximately 80 acres of low quality shrub-steppe habitat would be permanently lost or replaced beneath the developed footprint. The specific cover types that would be lost include an estimated 44 acres of very poor condition grassland, 23 acres of poor to fair condition shrubland, and 13 acres of

poor condition shrub grass. These low quality native cover types would be replaced with a manicured landscape typical of a state park setting. Open grassy areas and non-native ornamental shade trees would dominate the 80-acre addition to Potholes State Park.

Overall, the existing vegetation consists of low quality shrub-steppe communities dominated by annual grasses and weeds. This condition is the direct result of heavy recreational use due to the site's popularity as a dispersed camping and day use area. The development of this site is expected to have a net benefit on native habitats in other shoreline areas by reducing human use and disturbances in these undeveloped areas.

Off-Road Vehicle (ORV) Riding

Located in the Lower Crab Creek management area, the permanent closure of 919 acres of the Yellow Zone to ORV use would prevent additional losses and damage to the native plant communities present, and, over time, is expected to allow natural recolonization of exposed areas and trails to begin. The direct and indirect effects previously described within the Yellow Zone due to ORV riding would be partially eliminated.

Although short-term weed colonization along abandoned ORV trails can be expected, the anticipated long-term effect would be beneficial as 23 (was 37) acres of existing ORV trails are revegetated. These beneficial effects include recolonization by native species, an improvement in plant community composition and structure, reduced proliferation of weeds into new areas, and an increase in the condition and acreage occupied by native cover types. Rehabilitation of the most severely disturbed areas would accelerate soil stabilization, lessen the possibility of noxious weed establishment, and facilitate the rate revegetation occurs in exposed areas.

With continued ORV riding within the existing 1,895 Green Zone, the desertification process previously described (see Sections 3.4.7, 4.4.1 and 4.4.4) would continue to impact and eradicate the poor quality plant communities remaining in the 668-acre Eastern Dunes management area and 1,227- acre area outside the RMP boundary. Ultimately, it is expected that essentially the entire Green Zone would become an active sand dune, which would be difficult to reclaim with native species.

Fencing the east side of Sand Dunes Road would help prevent unauthorized ORV entry into this portion of the Red Zone. This would allow for a more successful rehabilitation program and faster revegetation in general. Without such fencing, it is unlikely that a positive outcome for vegetation would occur given the current level of ORV trespass that occurs in areas already posted and signed as closed to motorized use.

Dispersed Camping

Under the Preferred Alternative, an estimated 12,595 acres would be designated open to dispersed camping either year-round or seasonally. Of this total, the specific management areas "open year-round" (8,119 acres) include Peninsula North, Peninsula South, Lower Crab Creek Arm, Lower West Arm, Dunes/Sand Islands, and those "open seasonally" (3,950 acres) include Upper Crab Creek Arm and Upper West Arm. As previously identified and described, the adverse vegetative effects and trends associated with this popular activity would continue to occur within these management areas. These effects would primarily continue in existing dispersed camping areas located adjacent to the reservoir shoreline.

Of an estimated 5,989 acres closed to dispersed camping except in designated areas, the vegetation in three of the affected management areas - North Potholes Reserve, East Lind Coulee Arm, and Developed Corridor - consists of about 4,328 acres of good to excellent condition cover types. Closing these areas to random dispersed camping is expected to be particularly beneficial to the high quality plant communities and cover types present.

Two other management areas in this category - the West Lind Coulee Arm and O'Sullivan Site - South, contain about 627 acres of mostly poor condition cover types. By prohibiting dispersed camping, the plant communities found outside designated areas would have an opportunity to begin restoration and improvement. In those areas designated for dispersed camping, however, the additional loss of native vegetation is expected to be small since they have already been heavily impacted from past use. These areas, however, would remain a source for weed dispersal and proliferation.

The closure of 925 acres to dispersed camping within the O'Sullivan Site - North, Eastern Dunes, and Eastern Bluffs management areas are not expected to result in any major improvement in the cover types or plant community composition present. These management areas have already been heavily disturbed from past dispersed recreation activities, and generally support poor condition cover types, particularly in upland areas. Eliminating dispersed camping in these management areas is expected to reduce the cumulative impacts from other uses and weed introductions. In the long-term, O'Sullivan Site-North development as a unit of Potholes State Park would permanently convert 80 acres to a manicured vegetative setting.

This alternative also includes the designation of dispersed camping areas along the west shore of Moses Lake. The net effect on vegetation is expected to be minimal, however, since the designated dispersed camping areas selected would be located in areas already used for dispersed camping and day use.

Livestock Grazing

Although a few minor stipulations (i.e., a minimum two year rest period following fire, modifying the Grazing Plan to maintain site potential and objectives, and adjust grazing management to enhance habitat for special status species) would be added to the grazing permits issued by the WDFW, the net long-term effect on vegetation would be essentially the same as described for No Action.

Primitive Road Closures

An estimated 0.7 mile (one acre) segment at the west end of Powerline Road would be closed to motorized travel in addition to the 17.7 miles. This road segment would not be rehabilitated, however, since it would remain available for maintenance, emergency, or other administrative purposes. Consequently, no net positive or negative changes in vegetative conditions along the travel corridor are anticipated. The adverse vegetative effects associated with continued public use and motorized travel would occur along an estimated 41.9 miles of primitive road open year-round or seasonally.

Other Management Actions

The use of spot herbicide treatments to kill small patches of Eurasian water milfoil affecting public recreation facilities would be allowed. Non-targeted plants may be killed by some herbicides. Fast acting herbicides such as Aquathol may cause low oxygen conditions to develop as plants decompose (Department of Ecology, 1999). This action is not intended to result in species eradication, but as an ongoing measure to control milfoil in high-use public recreation areas when needed. Due to present reservoir fluctuations, water milfoil has yet to pose a series weed problem at Potholes Reservoir.

Trail and boardwalk development to control public access and foot traffic through wetland and riparian habitats in high use areas (i.e., the Developed Corridor) would help to curtail and new "social" trail development and adverse vegetative effects within these sensitive habitats. Although a loss of vegetation could occur beneath the trail footprint, this impact is expected to be minor or non-existent since they likely would be developed along trail corridors already established by human use.

In addition to the watchable wildlife features described in the Impacts Common to All Alternatives section, the Preferred Alternative includes two other wildlife viewing and interpretive areas (see Figure 2-4.1). The development of a 0.5-mile loop trail at West Lake/North Outlet would cross fair to good quality shrub-steppe, wetland and riparian habitats. Although the exact location of the trail has not been determined, an estimated 0.3 acres of vegetation beneath the trail's footprint would be lost.

Although a specific trail route has not been determined, a system of hiking trails and blinds would also be featured in North Potholes Reserve. With an emphasis on viewing waterfowl, shorebirds, and songbirds, a small but unknown amount of high quality riparian forest, shrubland, and shrub grass cover types would be lost. Some weed colonization along both trail corridors is anticipated.

Two Habitat Management Areas encompassing an estimated 3,396 acres of land would be designated in the Upper West Arm and Upper Crab Creek Arm management areas. The vegetation benefits outlined above for this management action (see "Impacts Common to Alternatives B, C, and D") would be realized on this affected acreage.

4.4.7 Alternative C - Preservation/Enhancement

Because Alternative C emphasizes the RMP goals and objectives established for natural resource preservation and enhancement, the management actions included in this alternative would facilitate the greatest improvement in native plant communities and the greatest decrease in the potential conversion or loss of these communities. Overall, the environmental benefits would be similar to Alternative B but greater in magnitude and extent than Alternatives A, B or D because each of the specific actions being considered would, individually and cumulatively, avoid or minimize the human and animal-related disturbance factors that potentially affect Potholes vegetation.

Campground and Associated Facility Development

Unlike Alternatives B and D, O'Sullivan Site-North would not be developed as a unit of Potholes State Park, but continue to be managed for dispersed camping and day use recreation. In the absence of converting 80 acres of low quality shrub-steppe habitat to a manicured landscape typical of a state park setting, continued and increased dispersed use throughout the area would further degrade plant community structure and composition and slowly reduce the native cover types present. The net effect, however, is not anticipated to be considerably different from the

present condition since the shoreline areas popular for dispersed use have already been heavily impacted from past use.

Off-Road Vehicle (ORV) Riding

Under this alternative, all Reclamation land inside the RMP study area boundary would be closed to ORV use. Within the 1,459-acre Yellow Zone, the impacts anticipated would be the same as described under the Preferred Alternative. Within the "Green Zone," the additional closure of the Eastern Dunes management area to ORV use would prevent further loss and damage to the poor quality shrubland (394 acres) and shrub grass (62 acres) cover types that remain.

Using the Peninsula South management area (ORV control area) as an indicator of vegetative trends in the absence of ORV use, natural recolonization would occur in many areas, but the large, exposed sand dunes are not expected to return to productive habitat in the foreseeable future without active rehabilitation efforts. It should also be noted that based on past study findings, it is highly likely that some of the exposed sand dunes may not recover even if active restoration is applied.

Fencing the Grant County ORV Area boundary would help prevent unauthorized ORV entry onto Reclamation lands within the Eastern Dunes management area. This would allow for a more successful rehabilitation program and faster revegetation in general. Without such fencing, it is unlikely that a positive outcome for vegetation would occur given the current level of ORV trespass that occurs in areas already posted and signed as closed to motorized use.

Dispersed Camping

Under Alternative C, an estimated 6,164 acres would be designated open to dispersed camping year-round and include Peninsula North, Lower Crab Creek Arm, O'Sullivan Site (North and South), Lower West Arm, and Dunes/Sand Islands. As previously identified and described, the adverse vegetative effects and trends associated with this popular activity would continue to occur within these management areas. These effects would primarily continue in existing dispersed camping areas located adjacent to the reservoir shoreline.

Of an estimated 12,420 acres closed to dispersed camping except in designated areas, the vegetation in five of the affected management areas - North Potholes Reserve, Peninsula South, Upper West Arm, East Lind Coulee Arm, and Developed Corridor - consists of about 7,748 acres of good to excellent condition cover types. Closing these areas to random dispersed camping

is expected to be particularly beneficial to the high quality plant communities and cover types present.

The remaining management areas in this category contain mostly poor to fair condition cover types. By prohibiting dispersed camping outside designated areas, adjacent plant communities would have an opportunity to begin restoration and improvement. In those areas designated for dispersed camping, however, the additional loss of native vegetation is expected to be small since they have already been heavily impacted from past use. These areas, however, would remain a source for weed dispersal and proliferation.

Unlike Alternative B, this alternative does not include the designation of dispersed camping areas along the west shore of Moses Lake. Instead, the area would be managed for day use recreation only. The net effect on vegetation is expected to be minimal, however, since the access routes leading to the lake and shoreline areas popular for dispersed use have already been impacted from past recreation activities. With continued human use, a continued degradation in plant community abundance and quality can be expected, but at a slower rate than Alternative B since dispersed camping would be prohibited.

Livestock Grazing

The positive and adverse effects of continued livestock grazing within a 7,400-acre area would no longer occur. In the larger 6,400-acre pasture, the winter/early spring season of use coupled with a relatively low stocking rate have not degraded the plant communities conspicuously, but has allowed the spread of cheatgrass and other weeds to proliferate. Although grazing can be an effective tool to control the spread of weeds, the absence of grazing is expected to reduce the proliferation of weeds since livestock would be eliminated as a weed dispersal mechanism. The loss of individual plants due to livestock trampling and herbivory would also be eliminated.

The smaller, 700-acre pasture is another story. Because the vegetation here is dominated by weeds and crested wheatgrass, the elimination of grazing may cause the weed component to spread markedly outside the pasture. The fire hazard potential within the pasture would also rise considerably. Without active restoration, no noteworthy long-term improvement in the pasture's native plant community composition or structure is anticipated due to the highly degraded vegetative condition already existing in this area.

Primitive Road Closures

Under Alternative C 17.7 miles of primative road scheduled for closure would be a closed. A total of 6.8 miles (about 10 acres) of primitive road currently open to motorized travel would also be closed. In addition, an estimated 7.8 miles (about 11 acres) of the primitive road network closed to motor vehicle use would be rehabilitated/revegetated. The general impacts associated with public motor vehicle travel (i.e., increased disturbance, weed introduction/ proliferation, and fire potential) would cease to occur and those associated with road closure (see Section 4.4.5) would begin along 6.8-miles of road. The net long-term effect would be an 11-acre increase in native shrub-steppe plant community abundance, and a reduction in the proliferation of weeds and their introduction into new areas. The adverse vegetative effects associated with continued public use and motorized travel would occur along an estimated 35.8 miles of primitive road open year-round or seasonally.

Other Management Actions

The environmental impacts associated with the plan features described in this category would be the same as Alternative B except as noted below.

Spot herbicide applications to kill small patches of Eurasian water milfoil would not occur. The effects associated with this management approach and described under the Preferred Alternative would be avoided. However, the abundance of this species in Potholes Reservoir could increase slightly during the spring and summer growth period and potentially affect other waters. Although some isolated water milfoil plant populations may proliferate into dense mats, their annual control would continue since reservoir operation and drawdown patterns would continue as in the past.

With respect to the watchable wildlife features included in Alternative C, a slightly greater vegetative improvement would be realized from limiting public access to the Lind Coulee North Arm watchable wildlife area to walk-in only. Although a 0.5-0.75-mile-long interpretive trail would be developed that uses the existing primitive road network, a net long-term increase in native plant community abundance and condition is expected from permanently closing the area to motorized use and rehabilitating those portions of the road network not needed for the interpretive trail.

Four Habitat Management Areas encompassing an estimated 7,166 acres of land would be designated in the Upper West Arm, Peninsula South, Upper Crab Creek Arm, and East Lind Coulee Arm management areas. The vegetation benefits outlined above for this management

action (see "Impacts Common to Alternatives B, C, and D") would be realized on this affected acreage.

4.4.8 Alternative D - Recreation Development

Under Alternative D, impacts to vegetation would be similar to those identified and described for Alternative B, but greater in magnitude and extent. Overall, Alternative D is expected to benefit vegetation on a landscape scale slightly more than Alternative A, slightly less than Alternative B, and much less than Alternative C.

Because most of the plan features and actions included in Alternative D are the same as the Preferred Alternative, the following discussion highlights what impacts are either different from or added compared to Alternative B.

Campground and Associated Facility Development

In addition to the vegetative impacts described under Alternative B, Alternative D would result in the following incremental positive effect:

A total of 12 of the most popular dispersed camping areas would be designated and managed as primitive camping areas. The installation of fire rings to delineate individual campsites and other amenities such as vault or seasonal toilets to focus public use is expected to further reduce the adverse effects of dispersed camping on adjacent vegetative resources. Reservoir-wide, the net effect of this action is expected to result in a slightly more positive vegetative effect since these primitive areas are expected to further focus and accommodate higher levels of public use, thereby reducing the adverse effects of dispersed use in other more sensitive shoreline areas.

Off-Road Vehicle (ORV) Riding

Vegetation within the 1,895-acre Green Zone (which includes the 668-acre Eastern Dunes management area) would continue to be adversely affected as described for the Preferred and No Action alternatives. Desertification of this area from year-round ORV riding would continue to impact the remaining plant communities present.

Unlike Alternatives B and C, ORV riding would continue to be authorized within the Yellow Zone (Lower Crab Creek Arm management area), but limited to designated roads and trails only.

Under present conditions, an estimated 15 miles of ORV trails and their intersections encompass about 37 acres of exposed ground within this zone. Although some reduction in the adverse vegetative effects and trends previously described would occur given the anticipated difficulty in enforcing this restriction, it is anticipated that the net result of this action would be a continued loss and degradation in the native cover types present, but at a slower rate. If ORV users limit their riding to designated roads and trails, negligible additional adverse impacts along these travel corridors are anticipated.

Within the Red Zone (closed to ORV use year-round), four ORV/motor vehicle access routes would be designated between Sand Dunes Road east to the west shore of Moses Lake. If ORV users limit their riding to these designated access routes, negligible additional adverse impacts along these travel routes are anticipated since the existing trail network would be used. However, similar to the discussion above for the Yellow Zone, this action would effectively open the area to indiscriminate ORV use. In this case, it is likely that the net result of this action would be a continued loss and degradation in the native cover types present.

A permanent 1.3-mile ORV access road would be authorized and designated through the Eastern Bluffs management area. Although the existing ORV closure outside this designated travel corridor would continue, similar to the Red and Yellow zone discussion above, this action would effectively open the Eastern Bluffs area to indiscriminate ORV use. The area is predominantly poor to good quality shrublands.

The final action related to ORV use involves the 1.7-mile-long Powerline Road which borders the Red and Yellow Zones. Unlike the other alternatives, this entire road segment would be kept open year-round to provide motorized public access. With fencing along the road corridor, negligible additional adverse effects are anticipated.

Dispersed Camping

Under this alternative, an estimated 13,948 acres would be designated open to dispersed camping either year-round or seasonally. Of this total, the specific management areas "open year-round" (11,984 acres) include the same 8,119 acres included in the Preferred Alternative plus an additional 3,865 acres within the Upper Crab Creek Arm, Eastern Dunes, Eastern Bluffs, and East Lind Coulee Arm management areas, and one management area (Upper West Arm) would be "open seasonally" (1,964 acres). Impacts from dispersed camping would be the same as previously described, but greater in magnitude and extent since a greater land area would be open to uncontrolled dispersed use. Compared to Alternatives B and C, opening the East Lind Coulee Arm to dispersed camping would adversely affect the area's diverse, high quality cover types.

Of an estimated 4,636 acres closed to dispersed camping except in designated areas, the vegetation in two of the affected management areas - North Potholes Reserve and Developed Corridor - consists of about 3,532 acres of good to excellent condition cover types. Closing these areas to random dispersed camping is expected to be particulary beneficial to the high quality plant communities and cover types present.

Impacts to an estimated 627 acres of mostly poor condition vegetation within the West Lind Coulee Arm and O'Sullivan Site - South would be the same as described for the Preferred Alternative as would the net effect associated with the interim closure of the 126-acre O'Sullivan Site - North management area to dispersed camping. In the long-term, O'Sullivan Site-North development as a unit of Potholes State Park would permanently convert 80 acres to a manicured vegetative setting.

The net adverse effect on vegetation due to the designation and development of primitive camping areas along the west shore of Moses Lake is expected to be greater than Alternative B. This increase in effect would directly result from the higher levels of public use expected along the lake's shoreline due to motor vehicle accessibility and facility improvement (i.e., seasonal toilets). Although no direct loss of vegetation would occur from the facilities themselves since they would be located in areas already impacted from dispersed use, increased public use throughout the shoreline area would increase the indirect effects associated with dispersed recreation.

Livestock Grazing

Grazing effects for Alternative D would be the same as Alternative A and B.

Primitive Road Closures

Unlike Alternatives B and C, this alternative includes no specific primitive road closures other than the 17.7 miles that have already been scheduled for closure. However, an estimated 6.4 miles (9.5 acres) of existing primitive roads or ORV trails would be opened to year-round motor vehicle travel. The vegetative effects associated with providing four ORV access routes in the Red Zone, a 1.3-mile ORV access route through the Eastern Bluffs management area, and keeping the 1.7-mile Powerline Road open year-round is described above under "Off-Road Vehicle (ORV) Riding."

In addition to these actions, Alternative D would reopen approximately 2.7 miles of closed road within the East Lind Coulee management area. This action would result in the loss of 4 acres of good quality shrub-steppe habitat that has re-colonized the previous roadbed. The indirect effects of reopening this area to motorized access would be the same as previously described (i.e., weed invasion, unauthorized travel outside road corridor, etc.). Overall, the adverse vegetative effects associated with public use and motorized travel would occur along an estimated 47.3 miles of primitive roads/trails open year-round or seasonally.

Other Management Actions

In addition to the watchable wildlife features and effects described in Section 4.4.3 and under the Preferred Alternative, the development of a 3.5-mile-long trail between Potholes State Park and the Winchester Wasteway would cross good quality shrub-steppe, wetland and riparian plant communities along the reservoir's western shoreline. Although the exact location of the trail has not been determined, an estimated 1.9 acres of vegetation beneath the trail's footprint would be lost.

By providing a footbridge across the Frenchman Hills Wasteway, public access to the Lower West Arm would likely increase considerably. Consequently, the indirect adverse effects expected from vegetative trampling and increased dispersed use beyond the developed trail corridor could be considerable. With appropriate interpretive signs along the trail, however, the extent of this effect could be reduced by drawing public attention to the management area's diverse and fragile plant and wildlife resources.

One Habitat Management Area encompassing an estimated 1,964 acres of land would be designated in the Upper West Arm management area. The vegetation benefits outlined above for this management action (see"Impacts Common to Alternatives B, C, and D") would be realized on this affected acreage.

No seasonal public access restrictions would apply within the North Potholes Reserve management area. With higher levels of public use, the direct and indirect vegetative effects associated with higher levels of dispersed use throughout the management area would be greater than Alternatives B or C.

Improvements to the Powerline boat launch and parking area, and to the informal Job Corps Dike boat launch (potentially involving a new location), would result in a direct loss of the riparian and other cover types affected by the developed footprints involved. No specific effects can be identified at this time since no site-specific plans have been developed.

4.4.9 Mitigation Measures

The use of native species or non-invasive species is recommended for revegetation efforts to maximize the potential to restore revegetated areas to high quality habitat beneficial to wildlife. Using native species in plantings and seedings may also prevent noxious weeds from spreading further.

Construction specifications would require contractors to preserve the natural landscape and prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the work vicinity. All trees, shrubs and other vegetation would be preserved and protected from construction operations and equipment except where clearing operations are required for permanent structures, approved roads, or excavation operations. All maintenance yards, field offices, and staging areas would be arranged to preserve trees and vegetation to the maximum practicable extent, and all disturbed areas would be reclaimed.

Damage to critical area vegetation would be strictly prohibited or limited only to areas required for construction activities when no other alternative exists.

Upon the completion of construction, any land disturbed but not permanently occupied by new facilities would be graded to provide proper drainage and blend with the natural contours of the land, covered with topsoil stripped from construction areas, and revegetated with plants native to the area and beneficial to wildlife. Native plantings would be required outside the developed footprints established for the campground expansion projects.

The final recommended composition of plant species, seeding rates, and planting dates would be determined in consultation with the WDFW and USFWS (where applicable or appropriate). Disturbed wetlands and riparian areas would be revegetated with wetland and riparian species.

Uplands would be revegetated to the native vegetative community appropriate for the site's soil type, topographic position, and elevation. Trees and shrubs appropriate for site conditions and surrounding vegetation types also would be included in the reclamation plant list for uplands.

4.4.10 Residual Impacts

With the mitigation measures identified above applied to each of the alternatives, the net residual effect on vegetation would continue to be adverse under the No Action Alternative. Although some positive changes would occur, the negative effects would outweigh the minor benefits

expected due to the projected increase in human use and associated disturbance factors that would occur throughout the study area. Overall, vegetation and habitat conditions are expected to decline on a landscape scale since there would be little change in the disturbance factors affecting vegetative abundance, the proliferation of weeds, and rare plant habitat.

On a landscape scale, net positive impacts on vegetation are expected under each of the RMP alternatives. Overall, the greatest vegetation benefits would be realized under Alternative C, followed by Alternatives B and D, respectively. Alternative B is expected to have a greater net beneficial effect than D due to a higher level of control over uncontrolled dispersed camping, a higher level of habitat protection due to HMA designation, and the partial closure of the Yellow Zone to ORV use. Alternative C would result in a considerably greater level of protection due to the amount of habitat from which potential human and animal disturbances would be alleviated or minimized.

4.5 WILDLIFE

4.5.1 Introduction

Many land uses occur within the Potholes area. Activities range from ORV riding in the ORV area to bird watching in the North Potholes Reserve. Each activity, regardless of its intrusiveness to wildlife, has the potential to impact wildlife populations within the study area. Common elements of the proposal that would potentially impact wildlife species are: 1) Recreation Management and Developed Recreation Areas; 2) Off - Road Vehicle Use; 3) Dispersed Camping; 4) Livestock Grazing; and 5) Road Closures. Management actions proposed to address the above issues are expected to enhance wildlife habitat and individual wildlife species. However, some negative impacts are also expected from the various management actions included in each alternative. Negative wildlife impacts would generally stem from increased human activity/use in the study area, and take the form of additional habitat destruction and wildlife harassment.

Issue/Concern: Prevention of damage to wildlife species and wildlife habitat.

Indicators:

Changes in habitat quantity
Changes in habitat quality
Effect on federal and/or state listed threatened, endangered or other special status wildlife species

4.5.2 Summary of Effects

Effects to wildlife species and habitat are directly related to vegetation loss or gain. Effects to special status species are discussed in the TES section. General species are affected by habitat lost and would have relative impacts to vegetation. Net positive effects on wildlife are expected under each of the RMP alternatives. The greatest benefit would be realized under Alternative C, followed by Alternatives B, D and A.

4.5.3 Impacts Common to All Alternatives

The resident wildlife at Potholes is intimately tied to the vegetative cover. Impacts on vegetation (see, Vegetation "Environmental Consequences") would have both direct and indirect effects on wildlife resources and species-specific habitat factors that affect them. Regardless of the alternative selected, some actions would have a positive, long-term beneficial impact on wildlife.

Recreation Management and Developed Recreation Areas

The SPRC would be authorized to expand present sites and facilities when future public recreation demand and facility use warrant additional development. An estimated 11-acre campground expansion area has been identified by the SPRC just west of the existing campground area. The campground expansion and associated facilities would have a long-term negative effect on approximately 11 acres of high quality shrub-steppe habitat and its associated wildlife species including raptors, NTMBs, ungulates, small mammals and reptiles. This habitat would be lost and would no longer be available for wildlife.

A 1.7 mile bicycle/pedestrian trail would be constructed between Mar Don and Potholes State Park. It is assumed that path will be within the existing SH 262 ROW from Mar Don to the golf course. At the golf course, it is expected the path would be constructed through high quality shrub steppe habitat to Potholes State Park.

Dispersed Camping

Maintaining dispersed recreation on the Dune Islands would continue to impact grebe, tern, and gull nesting through disturbance and habitat loss. The HSI for western grebes for the islands was zero, while western grebes are definitely present at Potholes Reservoir. Motorboat and personal

water-craft activity in and around sheltered bays and emergent wetlands during the April to July nesting season caused the HSI to be zero. Impacts would be reduced under the RMP alternatives due to WDFW's ability to close individual islands, or campsites for resource protection or site rehabilitation purposes.

Other Common Impacts

Future weed control efforts would be identified and prioritized to concentrate on areas with a high wildlife value and potential for native species reestablishment. This management policy provides a long term beneficial impact to wildlife by slowing or possibly stopping the degradation of high value habitats and improving the quality of wildlife forage and cover available.

4.5.4 Alternative A - No Action

Without a RMP, the SPRC and WDFW would continue to monitor land use activities in environmentally sensitive areas and strive to manage wildlife populations and habitat at current or enhanced levels. Site-specific control measures would be enacted to reduce habitat degradation from activities such as dispersed camping, recreation facility development, ORV use, and grazing if substantial resource damage is found. In the future, it is anticipated that recreational use at Potholes Reservoir would continue to increase. This would likely cause at least minor adverse impacts to wildlife and their habitats, depending on how the use is monitored and controlled.

Some situations may improve in the future with the No-action Alternative, simply as a result of the process of RMP development. This process has highlighted some deficiencies that have existed for a number of years due to unfamiliarity with the problem or lack of funding or staffing to address it. For example, this process has revealed some agricultural encroachment on Reclamation lands, which when rectified, may result in wildlife habitat being restored. The recent identification of Washington ground squirrels on the study site near dispersed recreation sites should help shape future management of that area (USFWS 2000).

Off - Road Vehicle Use

The continuation of ORV activity within the study area with current restrictions will continue to have a negative impact on wildlife. Unrestricted ORV use within this designated area is expected to increase over time. This will continue to impact the already heavily altered Green Zone. However, impacts to wildlife from continued use in the Green Zone area expected to be slight because of the Green Zones current state. The Green Zone is comprised of sand dunes with little vegetation. Continued ORV activity in this zone would only cause a slight change from current conditions.

ORV use will continue to have a negative impact on the high quality shrub-steppe habitat and wetland habitat present in the Yellow Zone. Increased use could result in new trail development, trespass outside the designated area, and a general degradation of habitat both within and adjacent to the ORV area. For example, through observations in the Yellow Zone, it was found that while many people stay on the existing trails within the Yellow Zone, some continue to make new trails through wetlands and over upland vegetation. Once new trails are established, they are used. It is estimated that there are 15 miles of ORV trails within the Yellow Zone. This represents 3% of the total Yellow Zone habitat lost because of ORV use over the years.

Field observations are consistent with WDFW and USFWS studies that attempted to quantify ORVs impacts to wildlife. For example, results from a 1997 WDFW study suggest ORV use within the study area has degraded native vegetation and adversely affected wildlife through direct disturbance, vegetation and cryptogam removal, weed invasion, and the alteration of the natural dune profile (WDFW 1997). Also a HEP study conducted by the USFWS in 1999 compared areas within the study area which receive regular and heavy ORV use (i.e., the Green Zone) with control sites and other areas within the study area (WDFW 1997, USFWS 2000), and found that ORV use negatively impacts wildlife and their habitats. In addition HEP found sites within the ORV area had a lower percentage of cover of vegetation and cryptogams; higher percentage of weeds (including designated noxious weeds) in the plant communities; and lower numbers and diversity of breeding birds.

Fencing the boundary between the Yellow and Green Zones would reduce trespass into the Yellow Zone during closure periods from October 1 to July 1. The Yellow Zone closure period was designed keep ORVs out of waterfowl breeding sites during the breeding period. Thus, reducing trespass into the Yellow Zone during the breeding season would provide a long-term beneficial impact to nesting waterfowl in this zone.

Dispersed Camping

Without an RMP, dispersed, unregulated camping would be allowed in all areas (total of 14 HMAs) except North Potholes Reserve and Potholes State Park provided that natural or cultural resources are not jeopardized. Active management of dispersed recreation sites would not occur unless monitoring indicates a need for such management in the future. No HMAs would be closed year-round.

Wildlife impacts from unrestricted dispersed camping include wildlife harassment, habitat destruction, and the "opening" of previously undisturbed areas to human activity. Harassment occurs when individuals choose a campsite in or near important wildlife habitat. Important habitat includes breeding areas, foraging areas, roosting areas, and retreat sites. For example, dispersed camping within Russian olive or willow thickets along the shoreline can seriously disturb nesting birds, deer seeking thermal cover, and raptor roosting. Human disturbance early in the nesting season may result in the abandonment of an otherwise successful nesting attempt.

Dispersed recreation and indiscriminate motorized travel in the study area would likely increase. Depending on the time of year and the habitat impacted, this could have significant adverse impacts to wildlife. For example, increased dispersed camping in and near riparian and wetland areas would further disturb nesting birds, including waterbirds and NTMB and deer and other animals seeking thermal cover in shrubs and trees along the reservoir shoreline. Additional indiscriminate motorized travel would cause habitat loss as well as disturbance to wildlife. Increased dispersed recreation would further increase risks of accidental fire in the area and allow weeds to continue to proliferate, especially in shrub-steppe and grassland areas.

Grazing

Continuation of the grazing program on 7,400 acres without any major modification or fencing along perennial streams or springs would continue to directly impact wildlife habitat through trampling, herbivory, and productivity alterations. These factors would continue to degrade sensitive habitats throughout the study area through vegetation trampling, soil compaction and weed proliferation. In the long-term, grazing often replaces fire resistant native vegetation with annual grasses and weeds leaving the ecosystem more susceptible to catastrophic fires.

Habitat loss as a result of grazing through trampling, weed proliferation, increased fire frequency and intensity would have a long-term negative effect on several wildlife species. Cattle negatively impact NTMB breeding sites for species such as the long-billed curlew, loggerhead

shrike, sage thrasher, and sage sparrow. Cattle also negatively impacts golden eagle, harrier, and red-tailed hawk foraging; western burrowing owl breeding; and mule deer foraging.

Road Closures

A total of about 42.6 miles of primitive road would remain open under the No Action Alternative. No specific primitive road closures would occur under this alternative. Primitive road use increases wildlife harassment by allowing humans to drive near or into sensitive habitats and increases habitat loss as the road system becomes further braided and expanded - opening previously undisturbed areas to human activity and disturbance. For example, "informal" roads leading to popular fishing spots, undeveloped boat launching areas, camping sites, etc., have removed a certain amount of habitat. Their disturbance has also allowed various weeds to proliferate along the edges of the roads and into adjacent habitats. Camping and parking areas have caused similar losses. Habitat has been impacted to some degree by trash which is sometimes left at dispersed sites. Activities at dispersed sites increase the risk of fires, which could burn large areas of native habitat. However, road closures (seasonally or permanently) in environmentally sensitive areas or where significant adverse environmental impacts have occurred will provide beneficial impacts to wildlife.

Other Dispersed Recreation

Under the No Action, Reclamation will Seek funding to analyze the level of disturbance and impacts to nesting birds and other wildlife caused by motorboats and personal watercraft. Strategies will be developed or modified to control the time and place of these activities to reduce human-caused disturbances and protect sensitive habitat areas and vulnerable wildlife populations. Meanwhile, Reclamation will continue to prohibit motorized boats, motor vehicles, and floating devices in North Potholes Reserve. The reserve would remain open for "walk-in"and non-motorized day use activities (hunting, fishing, wildlife observation, picnicking, etc.) year-round. This will provide a beneficial impact to wildlife by reducing potential human disturbance that could disrupt behaviors; delay nesting or cause nest abandonment with some birds; result in accidental or purposeful (illegal collecting or shooting) harm or death for some species; and increase risk of accidental fire, which could result in long-term devastation to an area in this arid environment.

4.5.5 Alternative B - Preferred

The management actions included in the Preferred Alternative would have an overall beneficial impact on wildlife throughout the study area. On a landscape scale, the beneficial impacts expected would exceed the localized adverse impacts identified. In addition to the impacts identified and described in Section 4.5.3, "Impacts Common to All Alternatives," Alternative B would have the following wildlife effects.

Recreation Management and Developed Recreation Areas

The development of the O'Sullivan site as a full service campground and day use area would be authorized. The development would result in the direct loss of 80 acres of low quality shrub-steppe habitat. This native cover would be converted to trees and non-native lawn. This would have a beneficial impact on metropolitan wildlife species such as the black-billed magpie, European starling, house mouse, etc.

HEP results from the O'Sullivan site revealed it had the lowest habitat quality of all sites evaluated (USFWS 200). The low quality habitat provides little wildlife benefit. The HEP study indicates that O'Sullivan would therefore be suitable for development without causing any adverse effects the wildlife resources at Potholes.

Under the Preferred Alternative the Upper West Arm and Upper Crab Creek Arm would be designated as "Habitat Management Areas." Public access of any type would be seasonally restricted in the south/central portion of North Potholes Reserve from March 15 through May 30. This will provide a long-term beneficial impact to wildlife by minimizing human interaction and disturbance during waterfowl and colonial nesting bird reproductive periods.

The development of a half-mile loop trail beginning at the North Outlet parking lot would impact 0.3 acres of shrub-steppe, wetland, and riparian habitats. Construction impacts would be minor because the trail would be constructed over existing social trails already established by fisherman and dispersed campers. Overall impacts would be beneficial because the trail would curtail unwanted social trail development and the associated wildlife habitat destruction.

Off - Road Vehicle Use

The partial closure and rehabilitation efforts in damaged areas of 919 acres of the 1,459-acre Yellow Zone and the fencing the east side of the Sand Dunes Road to prevent unauthorized ORV trespass into the Red Zone would provide long term beneficial impacts to wildlife. This would help eliminate some of the major activity currently degrading vegetation communities in the Yellow Zone. Although, natural revegetation of this area would be slow, except in the wetland and riparian areas. Improvements in habitat quality for many species of wildlife should also eventually be realized as the HEP study showed that most of the evaluation species had lower HSIs here than within the control site (USFWS 2000). The disturbance factors related to ORV activities in this area, as shown by WDFW (1997), would be virtually eliminated. This would benefit nesting waterfowl, NTMB, beaver, mink, mule deer, and possibly the northern leopard frog. ORV riding would continue in the Green Zone as under the No Action. Wildlife impacts in the Green Zone would be the same as described above under Alternative A.

Dispersed Camping

Under the Preferred Alternative, an estimated 12,595 acres would be designated open to dispersed camping either year-round or seasonally. Wildlife impacts would be the same as under Alternative A on the 8,119 acres open year round (Peninsula North, Peninsula South, Lower Crab Creek Arm, Lower West Arm, and Dunes/Sand Islands). However, signs would be posted seasonally to close specific areas, campsites or islands during critical wildlife breeding and nesting periods. Closure periods to protect breeding sites would generally apply from February 1 to June 30 for nesting species of concern: Canada geese, ducks, and colonial nesting birds (e.g., gulls, terns, herons, egrets, and grebes).

On the 3,936 acres "open seasonally" to dispersed camping (Upper Crab Creek Arm and Upper West Arm) impacts will be the same as the No Action except camping will be prohibited during important breeding or nesting periods (March 15 through May 30). This will provide a long-term beneficial impact to wildlife by minimizing human interaction and disturbance during waterfowl and colonial nesting bird reproductive periods.

Five thousand nine hundred eighty-nine acres would be closed to dispersed camping except in designated areas. The vegetation in three of the affected management areas - North Potholes Reserve, East Lind Coulee Arm, and Developed Corridor - consists of about 4,328 acres of good to excellent condition cover types. Closing these areas to random dispersed camping is expected to be particularly beneficial wildlife by minimizing wildlife-human interaction and disturbance and further reduce dispersed camping impacts described in Alternative A.

The closure of 925 acres to dispersed camping within the O'Sullivan Site - North, Eastern Dunes, and Eastern Bluffs management areas would result in minimal beneficial impacts to wildlife. These management areas have already been heavily disturbed from past dispersed recreation activities, and generally support poor condition cover types and subsequently little wildlife (USFWS 2000). However, eliminating dispersed camping in these management areas is expected to reduce the cumulative impacts from other uses and weed introductions.

This alternative also includes the designation of dispersed camping areas along the west shore of Moses Lake. The net negative effect on vegetation is expected to be minimal, however, since the designated dispersed camping areas selected would be located in areas already used for dispersed camping and day use.

Grazing

Alternative B maintains the current grazing permit which allows 600 AUMs from November 1 until March 15 on 6,700 acres and from March 15 to April 15 on 700 acres. Range conditions would be monitored and permit conditions and grazing plans modified accordingly to maintain or improve native rangeland species and appropriate site potential. The grazing permit and plans would be further modified as needed to maintain or enhance habitat for special status plant and animal species. This management plan, if fully implemented, should facilitate at least partial restoration of native plant communities in areas currently grazed (USFWS 2000). Wildlife impacts from grazing would essentially be the same as described for No Action.

Road Closures

Approximately 0.7 miles of primitive roads would be closed to motorized travel at the west end of the Powerline road. However, it would remain open for emergency and maintenance purposes. Thus, there would be no net positive or negative impact to wildlife as a result of this closure. Impacts from the remaining 41.9 miles of primitive would be the same as No Action.

Other Management Actions

Seasonal restrictions of motorized water craft to low-speed/minimum wake operation in the Upper West Arm and Upper Crab Creek Arm HMAs from March 15 through June 30 would have a long-term positive effect on nesting and breeding success for grebes, waterfowl, and other

shorebirds. It would also help maintain and perhaps improve wetland development along the reservoir shoreline.

Restricting public access of any type in the south/central portion of North Potholes Reserve (see Figure 2-4.1) from March 15 through May 30 would also have a long-term positive effect on nesting and breeding success for grebes, waterfowl, and other shorebirds by minimizing human interaction and disturbance during waterfowl and colonial nesting bird reproductive periods.

Allowing the limited use of spot herbicide applications to kill small patches of Eurasian water milfoil and purple loosestrife would have a short-term beneficial impact by protecting wildlife habitat value by maintaining open water for waterfowl nesting and feeding, amphibian breeding (leopard frog), beaver, and mink.

Maintaining and enhancing the diking system located in the North Potholes Reserve, Upper Crab Creek, and Upper West Arm management areas to increase the number and extent of "carp-free" waters would have long-term positive impact on many wildlife species. Carp presence within many of the wetlands has limited waterfowl production, as well as constrained successful reproduction by various other marsh and water birds. Aside from destroying rooted aquatic vegetation and causing turbidity by roiling the water, they eat aquatic insects (USFWS 1980). Up to an eight-fold increase in waterfowl use and production was predicted by the USFWS with the elimination of carp. Therefore, increasing the number of carp-free ponds would have a long-term positive impact on waterfowl reproduction, several other marsh and waterbirds, and northern leopard frog breeding.

4.5.6 Alternative C - Preservation/Enhancement

Management actions included in this alternative would facilitate the greatest improvement in native plant communities and the greatest decrease in the potential conversion or loss of these native communities than any of the other alternative being considered. This would result in a direct beneficial impact to wildlife within the RMP boundary. The environmental benefits would be similar to Alternative B but much greater in extent than Alternatives A, B or D because each of the specific actions being considered would, individually and cumulatively, avoid or minimize the human and animal-related disturbance factors that potentially affect Potholes vegetation.

Recreation Management and Developed Recreation Areas

Unlike Alternatives B and D, O'Sullivan Site-North would not be developed as a unit of Potholes State Park, but continue to be managed for dispersed camping and day use recreation. Dispersed camping would continue to degrade the plant community structure and composition and slowly reduce the cover types present. The net effect for wildlife species, however, is not anticipated to be considerably different from the present condition since the shoreline areas popular for dispersed use have already been heavily impacted from past use.

Off - Road Vehicle Use

Under this alternative, all Reclamation land inside the RMP study area boundary would be closed to ORV use. Within the 1,459-acre Yellow Zone, the impacts anticipated would be the same as described under the Preferred Alternative. Within the "Green Zone," the additional closure of the Eastern Dunes management area to ORV use would prevent further loss and damage to the poor quality shrubland (394 acres) and shrub grass (62 acres) cover types that remain.

The prohibition of all ORVs from Reclamation lands tied with restoration and revegetation of degraded areas within the Green and Yellow zones would provide long-term beneficial impacts to wildlife. This would allow for reduction in weeds, increase in coverage of cryptogams, and a decrease in percentage of bare ground. Also, improvements in habitat quality for many species of wildlife should be realized. Aside from the eventual restoration of over 2,000 acres of wildlife habitat, eliminating some major disturbance factors to existing wildlife would benefit those species immediately. Totally eliminating ORV use should also significantly reduce illegal use outside of the designated zones and roads. This may benefit nesting waterfowl, NTMB, and even northern leopard frogs, whose potential habitat can be degraded by illegal ORV use (USFWS 2000). It would further reduce the potential for accidental fires.

Fencing the Grant County ORV Area boundary would help prevent unauthorized ORV entry onto Reclamation lands within the Eastern Dunes management area. This would allow for a more successful rehabilitation program and faster revegetation in general. Without such fencing, it is unlikely that a positive outcome would occur given the current level of ORV trespass that occurs in areas already posted and signed as closed to motorized use.

The fencing of the east side of Sand Dunes Road between South Outlet and Powerline Road with non-motorized access routes to Moses Lake for day use activities only (e.g., fishing, hiking, picnicking, sunbathing, wildlife observation), would provide similar beneficial impacts as the Preferred Alternative. However, closing the site to dispersed camping areas would provide

greater beneficial impacts to wildlife by reducing the incidence of human/wildlife interactions (i.e., wildlife harassment).

Dispersed Camping

Under Alternative C, an estimated 6,164 acres would be designated open to dispersed camping year-round and include Peninsula North, Lower Crab Creek Arm, O'Sullivan Site (North and South), Lower West Arm, and Dunes/Sand Islands. Wildlife impacts would be virtually the same as described in No Action. The beneficial impact of closing specific Sand Islands would be the same as Alternative B.

Closing an estimated 12,420 acres to dispersed camping except in designated areas in five of the affected management areas - North Potholes Reserve, Peninsula South, Upper West Arm, East Lind Coulee Arm, and Developed Corridor are expected to be particularly beneficial to the wildlife resources at Potholes. The beneficial impacts would be the same as described in Alternative B, except the amount of area closed is greater in Alternative C.

Grazing

Livestock grazing would cease when the current permit expires. Coupled with appropriate weed control measures and revegetation efforts, this could help speed the long-term restoration of native habitats. Recovery of plant communities from over-grazing, vegetation trampling, and soil compaction is very slow in this arid environment; however, ceasing the current grazing permits would provide long-term wildlife benefits by removing the causative agent of grazing impacts (see No Action) and allowing the restoration process to begin.

Road Closures

Under Alternative C, a total of 6.8 miles (about 10 acres) of primitive road currently open to motorized travel would be closed. In addition, an estimated 7.8 miles (about 11 acres) of the primitive road network closed to motor vehicle use would be rehabilitated/revegetated. The general impacts associated with public motor vehicle travel (i.e., increased wildlife disturbance, the opening of previously "remote" areas to human activity, and fire potential see No Action) would cease to occur. The net long-term effect would be an 11-acre increase in native shrub-steppe plant community abundance, and a reduction in the proliferation of weeds and their

introduction into new areas. The adverse vegetative effects associated with continued public use and motorized travel would occur along an estimated 35.8 miles of primitive road.

Other Management Actions

Many specific management actions that would occur under the Alternative C are identical or similar to the Preferred Action. The following actions would have the same impacts as Alternative B: controlling shoreline access and trails detrimental to wildlife habitat, seasonally restricting public access of any type in the south/central portion of North Potholes Reserve, and maintaining or improving the diking system at Potholes.

Alternative C would enact more and longer water craft restrictions/prohibitions than Alternative B. Water craft would be prohibited in the Upper West Arm and East Lind Coulee Arm, restricted to low speed/minimum wake operation in the Upper Crab Creek Arm year-round, and seasonally restricted to low-speed/minimum wake operation in the Dunes/Sand Islands management area from April 15 through June 30. Water craft restrictions would provide long-term beneficial impacts to wildlife by enhancing nesting and breeding success for grebes and colonial nesting birds.

Spot herbicide applications to kill small patches of Eurasian water milfoil and purple loostrife would not occur. The beneficial effects associated with this management approach and described under the Preferred Alternative would not be realized under Alternative C.

4.5.7 Alternative D - Recreation Development

Under Alternative D, impacts to wildlife would be similar to those identified and described for Alternative B, but greater in magnitude and extent. Overall, Alternative D is expected to benefit wildlife on a landscape scale slightly more than Alternative A, slightly less than Alternative B, and much less than Alternative C.

Because most of the plan features and actions included in Alternative D are the same as the Preferred Alternative, the following discussion highlights what impacts are either different from or added compared to Alternative B.

Recreation Management and Developed Recreation Areas

A total of 12 of the most popular dispersed camping areas would be designated and managed as primitive camping areas. Facility development would cause a small irretrievable commitment of soil and vegetative resources beneath the developed footprints involved, but these losses are expected to have a negligible impact to wildlife since most of the facilities would be located on bare ground impacted from past use. Reservoir-wide, the net effect of this action is expected to result in a slightly more positive wildlife effect since these primitive areas are expected to further focus and accommodate higher levels of public use, thereby reducing the adverse effects of dispersed use in other more sensitive shoreline areas.

The feasibility of improving the Job Corps Dike boat launch would be analyzed under Alternative D. Upon further study, it may be preferable to improve vehicle and trailer parking and boat ramp usability by relocating the launch facility. Developing new boat ramps or improving existing ones would likely result in increase use in the North Potholes area. This would lead to further reduction in wildlife habitat from additional parking needed and the development of more dispersed camping sites to accommodate increased use. Disturbance from increased activities would further serve to adversely impact wildlife populations (USFWS 2000).

Off-Road Vehicle Use

Unlike Alternative C, ORV riding would continue to be authorized within the Yellow Zone but limited to designated roads and trails only. Limiting ORV use to the estimated 15 miles (37 acres) of trails would reduce the impacts currently occurring in the Yellow Zone.

If ORV users stay on the existing trail system and don't pioneer new trails this would provide a beneficial wildlife impact by holding the amount of vegetation loss at current levels. However, enforcing restrictions in the Yellow Zone has proven difficult in the past and it is anticipated that "trespass" into closed areas and the pioneering of new trails would continue. Under this scenario, impacts to wildlife in the Yellow Zone would be the same as those described under the No Action.

Within the Red Zone four ORV/motor vehicle access routes would be designated between Sand Dunes Road east to the west shore of Moses Lake. This action would effectively open the area to indiscriminate ORV use. In this case, this area would undergo native vegetation degradation and suffer adverse effects to wildlife through disturbance if recreationists don't stay on the provided access routes.

A permanent 1.3-mile ORV access road would be authorized and designated through the Eastern Bluffs management area. Although the existing ORV closure outside this designated travel corridor would continue, similar to the Red and Yellow zone discussion above, this action would effectively open the Eastern Bluffs area to indiscriminate ORV use. Impacts associated with opening new areas to ORV use would be similar to the No Action.

The final action related to ORV use involves the 1.7-mile-long Powerline Road which borders the Red and Yellow zones. Unlike the other alternatives, this entire road segment would be kept open year-round to provide motorized public access. In the absence of fencing, unauthorized motor vehicle entry into the closed Red Zone and seasonally closed Yellow Zone may occur. HEP results show that the Red Zone has some of the highest quality wildlife habitat for the indicator species evaluated. Degradation and destruction of vegetative resources found in these areas and have a negative long-term impact to the wildlife at Potholes.

Dispersed Camping

Impacts from dispersed camping would be the same as previously described, but greater in magnitude and extent since a greater land area would be open to uncontrolled dispersed use. Compared to Alternatives B and C, opening the East Lind Coulee Arm to dispersed camping would adversely affect the area's diverse, high quality cover types. Impacts associated with dispersed camping described under the No Action could also have a long-term negative impact on the Washington Ground Squirrel.
Of an estimated 4,636 acres closed to dispersed camping except in designated areas, the vegetation in two of the affected management areas - North Potholes Reserve and Developed Corridor - consists of about 3,532 acres of good to excellent condition cover types. Closing these areas to random dispersed camping is expected to provide a short-term beneficial impact to wildlife until use exceeds demand.

Impacts to an estimated 627 acres of mostly poor condition vegetation within the West Lind Coulee Arm and O'Sullivan Site - South would be the same as described for the Preferred Alternative as would the net effect associated with the interim closure of the 126-acre O'Sullivan Site - North management area to dispersed camping.

The net adverse effect on wildlife due to the designation and development of primitive camping areas along the west shore of Moses Lake is expected to be greater than Alternative B. This increase in effect would directly result from the higher levels of public use expected along the lake's shoreline due to motor vehicle accessibility and facility improvement.

Road Closures

Unlike Alternatives B and C, this alternative includes no specific primitive road closures. Instead, an estimated 6.4 miles (9.5 acres) of existing primitive roads or ORV trails would be opened to year-round motor vehicle travel. In addition to these actions, Alternative D would reopen approximately 2.7 miles of closed road within the East Lind Coulee management area. Overall, the adverse wildlife effects associated with public use and motorized travel, as described under No Action, would occur along an estimated 47.3 miles of primitive roads and trails.

Other Dispersed Recreation

Alternative D would restrict motorized water craft use to low-speed/minimum wake operation in the Upper West Arm HMA from March 15 through June 30 to enhance wildlife nesting and breeding success for grebes, waterfowl, and other shorebirds. This would have a long-term beneficial impact on the viability of waterfowl and shorebird populations at Potholes, however, the restriction's area less prohibitive than the Alternatives B and C.

4.5.8 Mitigation Measures

Mitigation for adverse impacts from implementing actions within the various alternatives eliminate or significantly reduce adverse impacts, or otherwise compensate for the losses. The following are USFWS recommendations for minimizing or avoiding impacts (USFWS 2000). The Bureau of Reclamation has committed to these mitigation measures.

> An Integrated Pest Management plan to benefit native plant communities and associated wildlife and control of noxious weeds.
>
> The development of new campgrounds, boat launches, interpretive trails, etc. should take place in areas which avoid or minimize adverse impacts to fish and wildlife. That may mean using existing developed and dispersed sites whenever possible, even if these areas are not the most aesthetically-pleasing sites.

Measures aimed at protecting and enhancing certain species that take place under this RMP as mitigation. These measures include:

> Within some actions, there is reference to monitoring for response of habitat and fish and wildlife to certain management actions and strategies and that if warranted,

making needed changes. It is important to ensure that monitoring protocols and schedules are clearly established, as well as standards for determining when management changes should be developed.

Some of the actions proposed under the various alternatives, such as development of additional State Park lands and the construction of various developments, should receive additional review and evaluation from the USFWS in the future, pursuant to the Fish and Wildlife Coordination Act.

The placement of Watchable Wildlife trails and sites needs to carefully consider the tradeoffs of getting people close to certain wildlife species to be able to appreciate them and degrading their habitat or otherwise disturbing them.

4.5.9 Residual Effects

With the mitigation measures identified above applied to each of the alternatives, the net residual effect on wildlife would continue to be adverse under the No Action Altemative. Although some positive changes would occur, the negative effects would outweigh the minor benefits expected due to the projected increase in human use and associated disturbance factors that would occur throughout the study area. Overall, vegetation and habitat conditions are expected to decline on a landscape scale. This would directly result in negative impacts to wildlife.

On a landscape scale, net positive impacts on wildlife are expected under each of the RMP alternatives. Overall, the greatest vegetation benefits would be realized under Alternative C, followed by Alternatives B and D, respectively. Alternative B is expected to have a greater net beneficial effect than D due to a higher level of control over uncontrolled dispersed camping, a higher level of habitat protection due to HMA designation, and the closure of the Yellow Zone to ORV use. Alternative C would result in a considerably greater level of protection due to the amount of habitat from which potential human and animal disturbances would be alleviated or minimized.

4.6 FISH

4.6.1 Introduction

Impacts to the Potholes Reservoir fisheries would primarily stem from water level fluctuations related to irrigation management; inflows of irrigation return water containing fertilizers and pesticides; PWC/motorboats disturbing and eroding shoreline habitat, and the high incidence of bass fishing tournaments. Also of concern is the increase in carp abundance; gradual decline of gamefish species; maintaining and enhancing game fish habitat; and soil erosion, habitat damage, and wildlife disturbance due to off-road vehicle use and disbursed camping.

The cause and effect relationships to fish habitat and shoreline erosion associated with reservoir water level fluctuations and wakes caused by water craft in shallow water areas would continue into the future.

Issue/Concern: Reservoir fisheries have exhibited a large decline in the last 10-15 years. Fishing pressure, water temperature and quality, predation, exotic species, reservoir fluctuations, and loss of spawning habitat have been identified as affecting the viability of these populations. The concern primary relates to panfish although many bass anglers expressed concern about the quality of the bass fishery. Many individuals were concerned with the effects of walleye and fish-eating birds as predators.

Indicators:

Fish population viability
Changes in reservoir turbidity and sedimentation
Water level fluctuation

4.6.2 Summary of Effects

Alternative A would result in the least benefit to fish or aquatic resources. The negative impacts to fish populations associated with continued vegetation loss, sediment delivery to the reservoir, and dispersed camping are described under the individual alternatives.

No impacts to fish or aquatic resources are expected with Alternatives B, C, or D. A net positive impact due to the development of Habitat Management Areas is expected regardless of the RMP alternative selected. Overall, Alternative C would have the greatest positive impact due to improved riparian and shoreline conditions, and reduced use of sensitive habitat areas.

4.6.3 Effects Common to All Alternatives

Reservoir operations would continue as in the past, which would result in similar Potholes Reservoir water level fluctuations due to irrigation management. Fluctuations in the water level will continue to cause changes in available fish habitat. Along the shoreline, wetland plants provide cover, potential breeding, spawning, and rearing areas for fish. Low water levels cause a temporary loss of vegetative cover, reducing the juvenile survival rates of shallow water species, stranding the eggs of nest building species, such as largemouth bass and sunfish that lay their eggs in shallow shoreline areas, and increased potential of predation in open water.

Productivity in the Potholes Reservoir system is probably changing as a result of the irrigation return flows, which are likely to be nutrient-rich. The Lind Coulee Wasteway is likely to contribute nutrients and fecal coliform contaminants to the reservoir via the wasteways. This nutrient enrichment is unlikely to produce any increase in reservoir productivity and zooplankton production that results in increased fish populations. Enrichment can produce undesirable blooms of algae and blue-green bacteria. These blooms contribute to fish kills due to oxygen depletion occurring when the algae dies back in winter or when toxins are produced by the microorganisms. The rate of water flow through the Potholes reservoir may help to reduce this condition as water residence time can play a role in nutrient cycling.

Water-based recreational activity throughout the study area is expected to continue to increase in future years. Motorboats and PWCs would continue to have access to most of the reservoir, including shallow areas with suitable aquatic vegetation and structural components to attract nest building species of warm water game and panfish (largemouth bass and sunfish). The use of aquatic motorcraft, particularly high speed, shallow draft PWCs, in these shallow areas during the spawning season likely would reduce the spawning success of nesting fish. Spawning bass and sunfish protect their nests during egg incubation and fry emergence. When adult spawners are driven from their nest temporarily by passing motorcraft, predation on the unprotected eggs and fry increases, reducing reproductive success. Juveniles, rearing in these areas would also be driven from the cover of shallow water vegetation and become easier prey for predatory adult fish.

Wave action from motorcraft utilized in shallow areas would continue to cause shoreline erosion, contributing to the transport of fine sediment into the reservoir from soil and shoreline erosion. Mortalities of fish eggs, larvae, and fry would result from the reduced transport of oxygenated water through fish nests or redds, and the smothering of eggs and young fish (fry).

4.6.4 Alternative A – No Action

Without the adoption of a RMP, impacts to aquatic habitat and the reservoir fishery would generally continue through existing sources. Some improvements in terms of the increased density of aquatic plants, invertebrates, muskrat, waterfowl, and other wildlife, as well as the improved water clarity occurred with the elimination of carp during two diking projects. However, the net change to aquatic habitat and fishery resource conditions would be small in the absence of controlling the land use and boating activities that currently degrade the habitat conditions needed for fish.

Current use of dispersed camping sites, and dispersed unstructured activities coupled with uncontrolled motor vehicle travel in sensitive habitats would continue to damage vegetation and increase soil erosion. Shoreline campsites would damage riparian habitat and increase erosion related sediment delivery to the reservoir. These impacts have a detrimental effect on the reservoir fishery by impacting the shade and cover for fish in near-shore areas, and by increased turbidity levels and sedimentation that can smother aquatic invertebrates, vegetation, and fish eggs/larvae. The fecal contamination from near-shore dispersed camping would increase nutrient loading.

Expansion campground sites projected for future use would reduce available habitat and increase the impacts on the reservoir fishery by compounding the issues discussed. However, the area would localize impacts, rather than projecting them over a larger area without the designated camping site. The facilities provided would minimize certain resource conflicts in that they centralize trash collection, and improve sanitation and waste issues.

Infestations of Eurasion watermilfoil will continue to establish on boat ramps, courtesy docks, and swimming areas.

4.6.5 Impacts Common to Alternatives B, C, and D

Each of the RMP alternatives includes management actions that are intended to reduce the disturbance factors that are currently impacting resource and habitat conditions throughout the study area. Although the specific actions vary by alternative (i.e., number of miles closed to motor vehicle travel, changes in the grazing permit program, etc.), all of the RMP alternatives are expected to benefit the fisheries resource through habitat restoration and rehabilitation through the development of Habitat Management Areas or HMA's. However, the extent of this restoration would be commensurate with the extent public use would be controlled and managed under each alternative.

Improved habitat conditions for fish would also be realized with the maintenance and improvement of shoreline structure and improved riparian conditions. By controlling activities on soils or in shoreline habitats sensitive to disturbance (i.e., limit and/or close dispersed camping sites) habitat conditions for fish would be improved. Overall, fishery improvements are expected due to improved shoreline cover and structure, cooler water temperatures, and lower sediment loads which impact fish larvae, eggs, and macroinvertebrate production.

Permanent primitive road closures would be coupled with revegetation efforts aimed at restoring or enhancing native plant communities, stabilizing soils, and reducing erosion and the delivery of fine sediment to the reservoir. The reduction of foot and vehicular traffic in riparian areas would permit the growth of native vegetation along shorelines, eventually providing cover for juvenile fish in near-shore aquatic habitat. A reduction in vehicular access would also decrease the potential for the disturbance of near-shore areas of aquatic habitat too shallow for boat access, which provide refuge for spawning fish.

Along with the expected decline in dispersed camping and shoreline fishing in areas where road closures occur, the RMP alternatives designate and manage "boat-in" and "dispersed" camping areas (the number of designated sites varies by alternative). This management strategy is intended to protect areas of undisturbed or sensitive habitat by drawing campers away from them and focusing/directing public use to designated areas, which are generally less sensitive and more suited to public use and its associated impacts.

Seasonally restrict public access or watercraft to low speed/minimum wake operation in certain areas to minimize human disturbance on waterfowl and other shorebirds using the habitat for nesting and breeding.

4.6.6 Alternative B – Preferred Alternative

The direct rehabilitation and/or gradual improvement in riparian, wetland and shoreline habitat conditions expected from the integrated actions included in the Preferred Alternative would have a direct beneficial effect on the reservoir and fisheries. Overall, the adverse effects on fishery resources described under no action would be either curtailed or eliminated. Maintaining and expanding the diking system would increase the number of "carp-free" waters suitable for waterfowl and special status species (e.g., leopard frogs). Those waters managed for fish would benefit habitat for warm water gamefish such as bass and bluegill.

Shoreline erosion control measures would be implemented, including the installation of structural shoreline erosion control features such as gabions and retaining walls. Construction-

related impacts on water quality would be essentially limited to short-term turbidity and siltation effects, which would be minimized by limiting construction activities to when the reservoir is at its lowest elevation. These short-term, localized impacts to aquatic resources would be offset by a long-term reduction in shoreline erosion that impacts fishery habitat, and egg and larvae survival, due to turbidity and sedimentation.

Other efforts to control soil/shoreline erosion and restore shoreline vegetation, thereby reducing sediment delivery to the reservoir and improving habitat conditions for fish, consist of restricting shoreline access trails and ORV management, and wetland/riparian rehabilitation and enhancement projects. The planting of native shrubs and plants coupled with the gradual improvement in wetland and riparian habitat conditions would contribute to erosion control and provide shade and cover for fish in near-shore areas. The construction of trails or boardwalks would prevent straying and subsequent habitat destruction while allowing the traditional access.

Although dispersed camping would be allowed to continue in most shoreline areas, impacts would be less than with Alternative A due to seasonal closures of specific areas critical for wildlife nesting and breeding. By allowing less dispersed camping in these shoreline areas, human harassment/disturbance during fish spawning and egg incubation periods would be reduced. This would provide additional protection for spawning fish and breeding waterfowl.

The closure of the yellow seasonal ORV use area and the establishment of two Habitat Management Areas would allow the rehabilitation and restoration of damaged habitat. This increase in suitable habitat and fisheries resources use would be beneficial to those populations utilizing the area.

Additional courtesy docks at the Glen Williams boat launch site and surfacing the boat launch at Blythe could increase the use of the reservoir by recreational boaters and PWC's. Additional use of the reservoir would lead to increased disturbance of spawning or juvenile fish in the shallow areas of the reservoir. The growth of developed public areas reduces the available habitat and increases the potential for shoreline disturbance and habitat degradation.

Periodic dredging and removal of sediments deposited at the base of the public boat launches could be temporarily disruptive to aquatic vegetation and animals in that immediate area.

A spot aquatic herbicide would be used to kill small patches of Eurasian water milfoil affecting boat ramps, courtesy docks, and public swimming areas under this alternative. Additionally, herbicide applications would be used to kill patches of purple loosestrife that are colonizing wetlands and shallow shoreline areas. Non-targeted plants may be killed and low oxygen conditions may develop as plants decompose, possibly causing localized fish kills. In the long-

term, localized removal of Eurasian water milfoil may result in increased production of aquatic insects and an increased growth rate in sunfish and other small sport fish.

4.6.7 Alternative C – Natural Resource Conservation

There would be no significant unavoidable adverse impacts, and no significant cumulative impacts associated with Alternative C. The net environmental benefit on fishery resources would be similar to Alternative B, but greater in extent and magnitude since cumulatively, the individual management actions included in this alternative would further decrease and minimize current disturbance levels, facilitating the greatest increase in natural revegetation of shoreline riparian vegetation.

Alternative C would further reduce the disturbance of upland and riparian vegetation and the delivery of sediment to the reservoir through the closing of the 3354-acre ORV use area to motorized travel. Four Habitat Management Areas would be designated for enhancement and preservation. Limiting the periodic dredging at the base of public boat launches will reduce periods of turbidity and habitat degradation associated with dredging.

Off-road vehicle use areas currently designated as yellow, green, and red would be eliminated, as all sections would be permanently closed. This compares to Alternative A (year round access to 1,895-acre Green Zones and seasonal access to 1,459-acre Yellow Zones), Alternative B (year round access to 1,895-acre Green Zones only), and Alternative D (same access as Alternative A, but with the addition of designated trails to the western shore of Moses Lake). Under Alternative C, motorized vehicle access and travel allowed in all closed areas for maintenance, administrative, and emergency purposes only, would minimally impact the area. The level of human disturbance and habitat degradation in this Alternative would be lower compared to any of the other alternatives.

The short and long-term impacts on fisheries associated with the specific site and facility developments included in the other alternatives would not occur under this alternative (i.e., recreation area development at O'Sullivan Site, and surfacing of the informal (cartop) boat launch at Blythe) since these plan features would not be provided.

No manipulation of reservoir water levels or spot herbicide applications would be used to control Eurasian water milfoil or purple loosestrife. This would prevent herbicide related fish kills and the loss of incubating fish eggs, fish larva and juvenile fish.

4.6.8 Alternative D – Recreation Development

Alternative D provides the highest level of recreational site and facility development and the largest area open for "dispersed" camping areas of the alternatives considered. Overall, developed and primitive recreation opportunities would be concentrated at specific sites environmentally suited for public recreation, and discouraged or controlled in areas with sensitive habitat or specific resource constraints.
Impacts to habitat would be similar to those described for Alternative A, but unlike Alternatives A, B, and C, dispersed camping would no longer be allowed in the Blythe parking area and public hunting would be prohibited. Off-road vehicle use impacts are similar to Alternative A, but with increased degrading impacts due to expanded access on currently closed roads and the proposed opening of the four red zone access routes to motorized vehicle and ORV use.

Impacts to fisheries and aquatic resources would be similar to those described for Alternative A, as enhancement and restoration are initiated under severely damaged areas. Unlike Alternative A, but the same as Alternatives B and C, the Upper West Arm would be a designated HMA and management actions would be the same as those in the Alternative B.

Alternative D also allows more development to occur, including the development of new recreation sites and facilities suited to accommodate existing and projected use. New facilities would be developed at O'Sullivan Site (as in Alternative B), and dispersed camping areas would receive some facility improvements to better manage public use.

Additional courtesy docks at the Blythe boat launch site could increase the use of the reservoir by recreational boaters and PWC's. Additional use of the reservoir would lead to increased disturbance of spawning or juvenile fish in the shallow areas of the reservoir as discussed in Alternative B.

Methods to control Eurasian watermilfoil would be the same as in Alternative B with the same expected effects to the fishery and aquatic plant and wildlife community.

4.6.9 Mitigation Measures

Site specific environmental compliance would be done prior to any construction or bank stabilization projects. At that time, site-specific erosion and sediment control measures would be identified and incorporated into the project's construction specifications, reducing sediment delivery to the reservoir. Construction sites would be revegetated and riparian areas near shorelines would be planted with trees and shrubs to provide shade and habitat for fish. Projects

built below the reservoir high water line would be timed for construction to occur when the reservoir pool is at its lowest elevation to avoid damage to fish spawning and rearing habitat caused by the release of sediment into the reservoir or increases in turbidity.

Short-term effects such as increased shoreline erosion in or near construction sites would be minimized by adhering to BMPs during project construction. The purpose of these BMPs will be to minimize erosion and sediment-laden runoff from construction sites into the reservoir and other surface water features. During final layout and site design, measures to minimize asphalt surface runoff and the potential for pollutants (e.g., oil) entering the reservoir would also be identified and incorporated into the design. Maintaining water quality and preventing sediment delivery into the reservoir would maintain suitable habitat conditions for successful fish spawning, egg incubation, macroinvertebrate production, and fish rearing.

Herbicides used for the control of Eurasian water milfoil and purple loosestrife would be selected for their low toxicity to aquatic wildlife and fish. Slower acting herbicides would be used because they are less likely to produce sudden drops in dissolved oxygen levels due to decaying vegetation killed during application of the herbicide. Proper selection of suitable herbicides would reduce or eliminate the potential for fish kills during the control of aquatic weeds.

4.6.10 Residual Effects

Alternative A with mitigation would result in the least benefit to fish or aquatic resources. Overall, with increased public use occurring into the future, continued destruction of riparian vegetation and habitat from dispersed "drive-in" camping, and other disturbance factors can be expected to rise. These impacts would further disrupt shoreline habitat and increase fish and aquatic wildlife disturbances in sensitive breeding areas. The negative impacts to fish populations associated with continued vegetation loss, sediment delivery to the reservoir, and dispersed camping have been described above under the individual alternatives.

With mitigation applied, no residual impacts to fish or aquatic resources are expected with Alternatives B, C, or D. A net positive impact due to the development of Habitat Management Areas is expected regardless of the RMP alternative selected. Overall, Alternative C would have the greatest positive impact due to improved riparian and shoreline conditions, and reduced use of sensitive habitat areas.

4.7 THREATENED AND ENDANGERED SPECIES

4.7.1 Introduction

Management actions proposed to address issues identified during the planning process are expected to enhance habitat and individual species. However, some negative impacts are also expected to occur from the various management actions that result in increased human activity/use in the study area.

Issue/Concern: The effects of the RMP Alternatives on TES species

Indicators:

Effects to endangered, threatened, and candidate plants and wildlife species

4.7.2 Summary of Effects

No effect to threatened, endangered, or special status species is expected from implementation of the RMP Alternatives.

4.7.3 Impact Common to all Alternatives

Vegetation

Ute ladies'-tresses can be adversely affected by habitat modifications associated with livestock grazing, vegetation removal, excavation, construction, stream channelization, and other actions that alter hydrology or vegetative cover (USFWS 1998). Specific to livestock grazing, light to moderate grazing in the fall, winter, or early spring appears to be compatible with the species, particularly in meadow sites. Limited grazing reduces or removes vegetation that would otherwise shade or out-compete the species, and, as long as it occurs outside the active growing/flowering/fruiting season, may be a benefit.

The probability that Ute ladies'-tresses (*Spiranthes diluvialis*) occur in the Potholes study area is very low. However, in the absence of conducting field searches for the species, it is impossible to definitively conclude that ladies'-tresses do not occur in the study area. To insure that potential impacts to the species are avoided, field inventories would be conducted prior to initiating any site development activities. This approach, coupled with consultation with the

USFWS prior to taking any action on the ground would insure the federally- listed plant is afforded the protection warranted under the Endangered Species Act A *no effect* would be expected for this species.

With respect to gray cryptantha (*Cryptantha leucophaea*), an upland forb and state sensitive species, its probability of occurrence within the study area is high since this species' preferred habitat is sandy soil in association with rabbitbrush and sagebrush occurrence. Consequently, site-specific field inventories would be completed and documented in accordance with NEPA prior to initiating site development. As described for the ladies'-tresses, potential adverse impacts to gray cryptantha would be the greatest under No Action, followed in descending order by Alternatives D, B, and C. Effects to special status species are the same as outlined in the Vegetation Section.

Terrestrial

In addition to surveys, Alternatives B and C contain measures to further populations of Threatened and Endangered species at Potholes. Under Alternatives B and C, bald eagle perching and foraging winter habitat would be identified and protected. Although wintering bald eagles use the entire reservoir, the North Potholes Reserve, Peninsula South, and Upper Crab Creek Arm management areas are the most heavily used. In the event bald eagles pioneer into or breed in an area, stipulations would be incorporated into existing management and activity plans to ensure human disturbance is kept to a minimum. Appropriate site protective dates and/or buffer zones would be established and implemented near nesting sites.

Enhance of bald eagle wintering and roosting habitat would be conducted by planting additional trees (i.e., cottonwoods and willows) where natural regeneration of suitable tree species is lacking or suitable trees are being lost or nonexistent. Measures (i.e., wrap tree trunks with wire netting) would also be taken to protect key roosting sites from beaver activity. Implementation of the RMP Alternatives would have *no effect* on the bald eagles. Effects to special status species are the same as outlined in the Wildlife Section.

Aquatic Species

Since no listed species are found in the project area, there would be *no effect* on any threatened or endangered aquatic species. Impacts to other special status species are addressed in the fish section.

4.7.4 Mitigation Measures

In consultation with the USFWS, mitigation measures would be developed to minimize adverse impacts where appropriate, to special status species and habitats Regardless of the alternative selected.

4.7.5 Residual Effects

No effect to threatened, endangered or special status species is expected from this action with site specific mitigation applied.

4.8 CULTURAL

4.8.1 Introduction

Even though a complete cultural resource survey of the RMP area failed to identify any National Register eligible properties, such surveys are never 100% certain. The Potholes area in particular, with large areas of shifting sands and shorelines which experience wave action and fluctuating water levels, there are always areas being covered over as well as uncovered. Nevertheless, the confidence level in the cultural resource survey is high.

Issue/concern - Inadvertent discoveries of cultural resources during management activities or public use of the RMP area, including unauthorized collecting of artifacts.

Indicators - Diligence to indications for cultural material revealed through activities disturbing the ground. Such cultural material will require assessment by a Reclamation archeologist before ground disturbing activity continues

4.8.2 Summary of Effects

All alternatives are designed to protect significant cultural resources. The ability to protect unknown or undiscovered sites is greatest in those alternatives in which ground disturbance is the least. Under No Action, dispersed camping would not be directed to specific sites designated and managed for “dispersed”, “boat in”, or “primitive” camping. Instead, this activity would continue to be allowed throughout the reservoir area (excluding the State Parks Management Zone). The action alternatives would allow these activities in varying degrees. Alternative C

would allow for the least restrictive while Alternative D would be the most. Alternative B would have a moderate restriction on these types of activities.

4.8.3 Impacts Common to all Alternatives

The Reclamation's policy is to preserve significant cultural resources *in situ*, and to avoid adverse effects to these resources when possible.

Class III surveys have been conducted in the Potholes Reservoir area. Those areas that were identified as having cultural significance would be avoided under all action alternatives. Any additional sites would be examined for cultural and historic significance at the time they are discovered. This would include Traditional Cultural Properties and protection of human burial sites, if discovered. Submission to the State Historic Preservation Officer will occur and concurrence will be reached on current and future cultural inventories for all alternatives.

The results of the Class III inventory will be used to prepare a Cultural Resources Management Plan within the context of the Potholes Resource Management Plan (RMP). The management plan will outline the specific management actions and measures needed to continue to protect cultural resources and limit damage from area activities.

There would be no effect to TCP since none have been identified in the area. No burial sites were identified, however if TCP or burial site are discovered in the future actions would be taken to protect those attributes.

4.8.4 Impacts Specific to the Alternatives

Several management actions (see Chapter 2) would apply to all the alternatives designed to protect cultural resources. Any future potential disturbance to cultural resources are discussed below and dependant on the amount and type of use by Alternative.

Motorized Vehicular Damage: Damage resulting from motor vehicle travel generally affects the surface layer of a site in localized areas (i.e., dirt roads, trails, hill climbs, etc.). The depth of disturbance depends on the soil conditions and the kind of vehicle activity. When motor vehicle use remains on existing roads and trails, much of the surface stratum at large sites may remain intact.

Alternative A would have the greatest potential for impacts to cultural properties retaining 3,354 acres in the ORV park. Alternative D would be next with 1,932 acres followed by Alternative B with 1,895 and C with 1,227 acres.

Other Recreational Uses: Excluding motor vehicle activities, this category includes effects from other recreational activities such as dispersed camping, hiking, horseback riding, hunting, etc. Potential effects generally consist of vandalism, artifact collection, pot hunting, excavation of fire or trash disposal pits, and localized soil churning and trampling. The collection of artifacts reduces the scientific value of a site, particularly when diagnostic items are picked up.

Alternative C would close the greatest amount of area from dispersed camping. Alternative B would be next followed by Alternative D then A. Improved acres for developed recreation would be 91 acres for Alternative B and D, 11 acres for A and C.

Livestock Grazing: The primary impact associated with livestock grazing is the trampling and churning of surficial cultural deposits. The highest potential for cultural resource damage by cattle is along perennial water sources (e.g., streams, springs, and seeps) where trampling can churn cultural deposits.

Alternative C is the only alternative that would decrease grazing in the area. All other alternnatives would maintain the original amounts.

Soil/Shoreline Erosion: Erosion is a potential factor affecting cultural deposits. Erosion from wave action can disturb portions or all of sites occurring around the reservoir perimeter at locations particularly prone to shoreline erosion.

Alternative A would have limited restrictions on camping, boating, and development. Alternative C would be the most restrictive followed by Alternative B and then D. This is also true for areas that would be changed to habitat conservation areas.

Construction and Material Excavation: Some of the most severe site-specific effects can result from construction or material (gravel) excavation activities, since they typically have the greatest potential to disturb an area. These activities, however, are not expected to unknowingly impact cultural resources since location-specific cultural resource clearances would be obtained prior to initiating such actions. When necessary, consultations per 36 CFR 800 to determine eligibility, project effect, and appropriate treatment or mitigation of adversely affected Register-eligible sites would be completed. Potential impacts to all alternatives would be the same.

4.8.5 Mitigation Measures

Obtain location-specific cultural resource clearances when agency actions, such as recreation enhancements or facility development occur; avoid adverse effects on cultural resource sites by relocating or redesigning any proposed development.

Conduct consultations, per 36 CFR 800, to determine site eligibility, project effect, and appropriate treatment of adversely affected Register-eligible sites.

Determine whether cultural resource sites are present on involved lands when permits and leases for grazing, agriculture, recreation, or other actions involving Reclamation lands are under consideration for issuance or for renewal. If damage could occur or is occurring, the Reclamation would work with the WDFW to consider altering the land use agreement to exclude use of the site or include conditions that would avoid or reduce damage.

In accordance with the Native American Graves Protection and Repatriation Act (NAGPRA) initiate actions to protect or remove human burials if they are reported to be exposed or endangered by reservoir operations, natural erosion, or land use activities.

Initiate cultural resource investigations and consultations if future developments are proposed in areas not previously surveyed. Management actions would be defined in a Memorandum of Agreement with the Washington State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (the Advisory Council). Native Americans with interests at Potholes Reservoir would be consulted, as appropriate, to identify, protect, or mitigate effects to sacred or traditional cultural properties.

Implement public education programs to reduce accidental damage to or vandalism of cultural resources, and promote resource protection by the public.

4.8.6 Residual Effects

Applied mitigation would help to protect undiscovered cultural properties. No residual effect is expect with the implication of the Preferred Alternative and applied mitigation.

4.9 INDIAN TRUST ASSETS

4.9.1 Introduction

The United States has a trust responsibility to protect and maintain rights reserved by or granted to Indian Tribes or individuals by treaties, statutes, executive orders and other agreements entered into by the Reclamation or the Department of the Interior. This responsibility is sometimes further interpreted through court decisions and regulations. This trust responsibility requires that all federal agencies, including the Reclamation, take reasonable actions necessary to protect trust assets.

Issue/Concern: Understand and protect the cultural aspects of the Potholes area including Indian Trust Assets.

Indicator:

Effects on Indian Trust Assets

4.9.2 Summary of Effects

Opportunities for hunting, fishing, and gathering would continue, and would be enhanced due to improved management of resources. Under all alternatives some areas would be transferred to the administration of the SPRC, where hunting would not be allowed. Alternative D would transfer the most area, followed by Alternatives C and B.

4.9.3 Effects Common to all Alternatives

Under the No Action Alternative, vegetation would be further degraded from current conditions which would create an impact upon the gathering of food and medicinal plants. No additional areas would be closed to hunting. Fishing opportunities would remain the same.

Under all the RMP alternatives, if hunting were currently occurring on areas being transferred to the administration of SPRC, where hunting would not be allowed, there would be an impact to that privilege. In the long-term, gathering opportunities are expected to be enhanced due to a reduction in the disturbance factors which adversely affect vegetative resources within the study area. Fishing opportunities are also expected to be enhanced in the long-term due to improved management in the study area.

Additional discussion of impacts to resources which support hunting and gathering is found in Chapter 4 Vegetation, Wildlife, and Fish Section which discuss environmental impacts to vegetation, fish, and wildlife.

4.9.4 Mitigation Measures

Reclamation will work with affected Tribal governments if specific ITAs are identified as being impacted.

4.9.5 Residual Effects

Residual effects would be as stated in section 4.9.3.

4.10 VISUAL QUALITY

4.10.1 Introduction

This section assesses the potential impacts to visual resources resulting from actions proposed in the RMP. Impacts can occur when land use activities conflict with existing landscape characteristics such as topography, vegetation, and in some cases, existing structures and land use patterns. This analysis describes how a proposed activity could alter, conserve or damage scenic qualities within the study area. It takes into account the existing scenic quality of the landscape and visitor attitudes toward changes in the landscape. Overall, the adoption of a RMP would result in a net improvement in the visual quality at Potholes Reservoir.

Issue/Concern: Maintenance or improvement of existing landscape character and scenic attractiveness within each management unit of the RMP study area.

Indicators:

Deviation from existing landscape character, including visible habitat degradation such as erosion and loss of vegetative cover; evidence of dumping, trash and human waste

Rehabilitation or restoration of previously disturbed areas to maintain or improve scenic quality

Additional viewing opportunities

4.10.2 Summary of Effects

Under the No Action alternative, negative effects on visual quality would continue due to the projected increase in human use and associated disturbance factors throughout the study area. Overall, resource conditions on a landscape scale are expected to decline since there would be little change in the disturbance factors affecting resource conditions and visual quality in the study area.

On a landscape scale, net positive impacts on visual quality are expected under each of the RMP alternatives. Overall, the greatest benefits would be realized under Alternative C followed by Alternatives B, D and A, respectively.

4.10.3 Effects Common to All Alternatives

The following impacts to visual resources would occur with or without the implementation of an RMP:

Development of a 1.7 mile asphalt-surfaced bike trail between Potholes State Park and O'Sullivan Dam would provide additional opportunities for reservoir views for bicyclists and pedestrians without changing the scenic quality within the Developed Corridor.

The Potholes State Park expansion would convert 11-acres of low-quality shrub-steppe habitat to an irrigated and landscaped park area. Sensitive site planning, landscaping, and building design are expected to reduce long-term contrasts to a weak-to-moderate level. The park addition is contiguous with the existing park area and is not expected to draw attention away from the natural elements of the surrounding landscape. Because this state park expansion is expected to be free of aesthetically undesirable or discordant sights and influences, the Developed Corridor's scenic quality is not expected to change.

Construction activities and subsequent changes in the landscape would be visible from sensitive viewpoints, but cause minimal cumulative change. Construction activities such as vegetation clearing, earthwork, and equipment and material storage would cause minor, short-term impacts to visual quality. Site regrading and revegetation immediately following construction would deter adverse long-term impacts.

The placement of fencing to reduce indiscriminate ORV entry into areas closed to non-motorized vehicles, and the revegetation of areas severely damaged by ORV use would maintain scenic quality in the Upper Crab Creek Management Area.

Throughout the study area, the removal of trash dumps and the promotion of "pack-in/pack-out" waste management strategies would help improve visual quality by removing or curtailing evidence of human intrusion.

4.10.4 Alternative A - No Action

Without a RMP, opportunities to protect and enhance the visual quality and scenic resources at Potholes Reservoir would not be fully realized. As recreation use increases, so would incidences of indiscriminate ORV use, cross country travel, and primitive road use. Dispersed camping would be less controlled than in other alternatives, leading to increased soil erosion, site disturbance, and native vegetation loss in environmentally sensitive areas. This visible evidence of recreation overuse would result in negative, long-term, direct and indirect impacts to landscape character within each management unit.

In addition to the actions common to all alternatives, the No Action alternative includes actions that would result in beneficial, long-term direct impacts to visual quality. The development of Watchable Wildlife vehicle route in the Peninsula North and South Management Units would increase viewer sensitivity and appreciation of the area's natural resources. Interpretive signs and pullouts would be designed to blend into the site's characteristic landscape, keeping impacts to a minimum.

Dispersed camping restrictions in the North Potholes Reserve would limit surface disturbing activities in sensitive environments and focus human activity into areas environmentally suited for public use, reducing visual impacts caused by increased soil erosion, rutting, and vegetative loss. The seasonal and permanent closure of selected primitive roads and trails to motor vehicle use would result in an overall improvement in visual quality and prevent additional areas from becoming degraded. Visual quality would be further improved through the rehabilitation of severely damaged areas which would encourage revegetation and restoration of primitive landscape qualities.

4.10.5 Alternative B Preferred

Overall, most of the specific actions included in the preferred alternative would protect and enhance visual resources by reducing the disturbance factors that adversely impact visual quality and resources. Year-round dispersed camping restrictions would limit surface disturbing activities in sensitive environments and focus human activity into areas environmentally suited for public use, reducing visual impacts caused by soil erosion, rutting, and vegetative loss. In addition to North Potholes Reserve, nine management areas would be affected by camping

limitations. The degree of change would be most evident in the management areas with higher scenic quality ratings: Upper Crab Creek Arm, Upper and Lower West Arm, East Lind Coulee Arm, Eastern Dunes, and Eastern Bluffs (Table 3.10-1).

The permanent and seasonal closures of selected primitive roads and trails to motor vehicle use would prevent additional areas from becoming degraded. The rehabilitation of severely damaged areas would restore natural landscape values and improve visual quality within the Eastern Bluffs management unit. Designated footpaths from parking turnouts on Sand Dunes Road to the west edge of Moses Lake would deter the proliferation of "social trails" and keep habitat areas visually intact.

Actions to close the existing ORV "Yellow Zone" to motorized travel and to rehabilitate trails would restore scenic quality in the Lower Crab Creek Management area to a more natural-appearing state.

The development of the O'Sullivan Site-North site as a unit of Potholes State Park would replace 80 acres of low-quality shrub-steppe habitat with a developed campsite and day-use area, characterized by open grassy areas landscaped with non-native, ornamental trees. Due to the presence of a small store and a 70 unit non-conforming trailer park, impacts from the new development would not change the scenic quality of the management unit. Sensitive site planning, landscaping, and building design would keep long-term contrasts to a low-to-moderate level.

Construction activities and subsequent changes in the landscape would be visible from sensitive viewpoints, but cause minimal cumulative change. Construction activities such as vegetation clearing, earthwork, and equipment and material storage would cause minor, short-term impacts to visual quality. Site grading and revegetation immediately following construction would minimize adverse long-term impacts.

A Watchable Wildlife vehicle route would be established in the Peninsula North and Peninsula South management units. The beneficial impacts to scenic resources are described under Alternative A.

4.10.6 Alternative C - Preservation/Enhancement

Of the three action alternatives, Alternative C provides the largest measure of visual resource protection primarily due to additional restrictions on dispersed camping and motor vehicle access within the study area. The effects of this Alternative would be the same as Alternative B, with the following exceptions:
The cancellation of grazing permit TP-01 would remove cattle from prime wildlife viewing areas, directly and indirectly improving scenic quality.

Unnecessary primitive roads in the North Potholes Reserve, the Upper West Arm, the Upper Crab Creek Arm, the West Coulee Arm, and the East Coulee Arm would be revegetated, improving the visual cohesiveness of the habitat area.

Dispersed camping would no longer be allowed in the Peninsula South, Upper West Arm, the Dunes Sands Island, and Upper Crab Creek Arm. This action would eliminate visual degradation due to soil erosion, site disturbance, and native vegetation loss in environmentally sensitive areas.

The O'Sullivan Site North would not be developed as a unit of Potholes State Park, but would continue to be managed as a dispersed camping area. The scenic quality would remain in a more natural-appearing state than if it were to be developed.

4.10.7 Alternative D - Recreation Development

Fewer camping restrictions and greater motor vehicle access in this alternative would result in more opportunities for habitat degradation as recreation visits increase. The effects would be the same as Alternative B, with the following exceptions:

Increased public and motorized vehicle access would result in a generalized loss of habitat cover and visible human intrusions in management units with high scenic quality. Year-round access in North Potholes Reserve and the Upper Crab Creek management area would expose sensitive habitat zones to visible human disturbance and activity. Roads and trails in the ORV "Yellow Zone" would remain seasonally open to motorized vehicles. Motorized vehicle access would be established between the Eastern Dunes and the O'Sullivan Site in the Eastern Bluffs management unit. Two miles of closed primitive road to motor vehicle travel would be opened in the West Lind Coulee Arm and the East Lind Coulee Arm, would result in long-term, direct negative impacts to visual resources.

The development of a Watchable wildlife interpretive hiking trail in the lower west arm would provide additional opportunities for enhanced landscape viewing.

The installation of permanent vault toilets at the Powerline Boat Launch, Sampson's Pit, and Dispersed Camping Area #4, and seasonal toilets at Sampson's Beach, Dispersed Camping Area #2, and the west shore of Moses Lake would reduce inappropriate dumping of human waste.

4.10.8 Mitigation Measures

There are no mitigation measures for Visual Resources.

4.10.9 Residual Effects

Residual effects are the same as those effects discussed for each alternative.

4.11 NOISE

4.11.1 Introduction

No issues or concerns were identified during the scoping process. During the recreation survey, problems with noise were related to personal use watercraft. The resulting noise from these crafts were distracting to some of the people served. The alternatives address the concern about noise by including management actions that restrict or regulate use within the study area.

Issue/Concern: Effects of the RMP alternatives increases or decreases in noise in the project area.

Indicators:

Effects of actions on increases in noise

4.11.2 Summary of Effects

Noise levels are expected to increase in the project area from increases in development, use, and population regardless of the alternative chosen. The differences between the alternatives are based on area restrictions and administration of sites. Alternative D would have the least

increase in noise followed by B and C. Alternative A would potentially have the greatest increase in noise.

4.11.3 Impacts Common to All Alternatives`

Regardless of the alternative selected, noise levels are expected to increase throughout the study area due to the projected increase in public visitation and recreation activity levels. Noise emissions would remain the highest and most concentrated at the developed recreation sites that receive the greatest number of visitors (i.e., Developed Corridor, Glen Williams Boat Launch, O'Sullivan Site SE, Grant County ORV area, etc.).

All the alternatives would add additional facilities at the Potholes State Park which would increase the potential noise levels in and around those facilities.

4.11.4 Alternative A - No Action

With an increase in motorized (road and boat) travel throughout the study area, noise incidents and conflicts around the lake would increase particularly in the ORV areas.

4.11.5 Impacts Common to Alternatives B, C and D

With any of the RMP alternatives, several overall changes in recreation and access patterns would affect noise levels at Potholes. Differences between the alternatives would primarily stem from 1) the number of primitive roads closed, and 2) the number of water-based and land-based recreation support facilities developed. Both these general actions would tend to further concentrate Potholes visitors and use into focused recreation areas.

Overall, increased noise emissions are expected to occur in those areas designated and managed for public recreation and visitor use. The designation of "boat-in" camping areas would further exacerbate motorboat emissions in and near these sites as boats ingress and egress the shoreline. The elimination of motor vehicle travel along portions of the primitive road system, however, would eliminate combustion engine noise along these travel corridors.

Wake restrictions in the Sand Islands areas would lessen noise and noise harassment to wildlife in varying degrees for all alternatives. Alternative C would be the most aggressive followed by B and then D.

4.11.6 Mitigation Measure

During project-specific construction activities, contractors would be required to comply with applicable federal, state, and local laws and regulations concerning the prevention and control of noise emissions. Contractors would be required to use reasonable available methods and devices to control, prevent, and reduce noise emissions including a no construction restriction from dusk to dawn in consideration of the sensitivity of state park campground users and/or nearby residents.

4.11.7 Residual Effects

Mitigation would tend to lessen the short-term effects of noise. It would serve to regulate areas for control of construction related noise emissions and locate groups in areas where those types of volumes are not expected.

4.12 LAND USE

4.12.1 Introduction

Bureau of Reclamation lands and waters at Potholes would continue to be administered through a Memorandum of Agreement (MOA) between the United States and the State of Washington. Day-to-day resource and recreation management would continue to be provided by the SPRC and WDFW with oversight by the Reclamation.

Issue/concern: Appropriate management of land use change within the study area

Indicators:

Acreage of land use administration change

4.12.2 Summary of Effects

Table 4.12-1 compares the land use and administrative changes expected with each of the Potholes Reservoir alternatives. Impacts to recreation use are described in Section 4.13 of this chapter.

Table 4.12-1
Effect of Alternatives on Land Use
Potholes Reservoir, Washington

	Approximate Acreage Affected by Alternative			
Land Use Activity	**A**	**B**	**C**	**D**
Expand Potholes State Park	11	11	11	11
Develop the O'Sullivan Site-North as a unit of Potholes State Park	0	80	0	80
Designate the Upper West Arm and Upper Crab Creek Arm as HMAs	0	3396	0	0
Designate the Upper West Arm, Upper Crab Creek Arm, Peninsula South, and East Lind Coulee Arm as HMAs	0	0	7166	0
Designate the Upper West Arm as a HMA	0	0	0	1964
Modify ORV land use agreement between WDFW and Grant County to include only the Reclamation lands in the existing "Green" and "Yellow" zones	105	0	0	105
Modify ORV land use agreement between the WDFW and Grant County to include only Reclamation lands within the Eastern Dunes Management area and south half of Section 10, T18N, R28E	0	1779	0	0
Modify the ORV land use agreement between the WDFW and Grant County to include only Reclamation lands in the south half of Section 10, T18N, R28E	0	0	320	0
Transfer "lead agency" management in Developed Corridor to SPRC	0	0	0	561
Transfer "lead agency" management at O'Sullivan Site to WDFW	0	0	80	0
Allow Permit TP-01 to expire without renewal	0	0	7400	0
Reopen portion of primitive road network	0	1.5	0	9
Permanently close primitive roads	17.7	18.4	24.5	13
Seasonally close primitive roads	3.2	1.5	1.5	1.5

4.12.3 Impacts Common to All Alternatives

Several land use-related actions would occur regardless of the alternatives selected. These include:

> Land use agreements (i.e., leases, licenses, permits, etc.) would be continued or renewed for the following services. The individual and cumulative impacts

associated with each of these activities would continue regardless of the alternative selected.

- The New Mar Don Resort
- Agricultural Leases

The Potholes State Park expansion area would convert about 11 acres of mature shrub-steppe habitat into an intensively managed state park campground and day use facility. The park expansion is consistent with the Shorelines Master Program's "rural" designation which restricts intensive development along undeveloped shorelines.

The development of an asphalt-surfaced bicycle/pedestrian trail between Potholes State Park and O'Sullivan Dam would result in a new use for the area with minimal impact to existing and adjacent land uses.

All the development-related actions included in each alternative are consistent with the Shorelines Master Program objectives established for each environment.

4.12.4 Alternative A – No Action

In addition to the actions common to all alternatives, the following in land use and administration impacts would occur under Alternative A:

The land use agreement between the WDFW and Grant County to operate and maintain an ORV Area would be modified to exclude approximately 105 acres of land in the Eastern Bluffs management area currently included in the existing ORV Area lease, but situated outside the "Green Zone" boundary. This action returns the management of lands not used for ORV use to the Reclamation.

The "watchable wildlife" vehicle route in North Potholes Reserve would utilize the existing roadbed and involve no land use change. The proposed sites in the Lind Coulee North Arm would require the conversion of a small, undetermined amount of vacant land to gravel parking turnouts, short foot trails with blinds, and interpretive signage.

4.12.5 Alternative B - Preferred

In addition to the actions common to all alternatives, the following actions would result in land use and administrative impacts under Alternative B:

The designation and management of two management units, the Upper West Arm and the Upper Crab Creek Arm as Habitat Management Areas (HMA's) would preclude future development, including new roads, within the units.

Dispersed camping would be eliminated as a land use in the Eastern Bluffs, the Eastern Dunes, and the Developed Corridor. The designation and management of dispersed camping sites would not involve any site-specific change in land use since each selected site is currently used for dispersed recreation activities. However, the action would change the existing camping use.

The WDFW and Grant County land use agreement to manage the ORV area would be modified to include only the lands in the Eastern Dunes management area and the south half of T18N, R28E, S10 (approximately 320 acres). The western portion of Powerline Road would be closed and motorized vehicle and ORV use would be eliminated in the some of the existing "Yellow Zone" (540 acres).

The O'Sullivan Site North site would convert vacant land currently used for dispersed, waterfront recreation activities, to a developed recreation area managed by the SPRC.

Proposed "watchable wildlife" viewing opportunities including a half-mile walking loop from the North Outlet parking lot and the development of hiking trails and blinds in North Potholes Reserve would result in a small, undetermined amount of vacant land converted to non-invasive recreation use.

4.12.6 Alternative C – Preservation/Enhancement

In addition to the actions common to all alternatives, the following in land use and administration impacts would occur under Alternative C:

The designation and management of two management units, the Upper West Arm and the Upper Crab Creek Arm as Habitat Management Areas (HMA's) would preclude future development, including new roads, within the units.

The ORV boundary would be modified to eliminate ORV use in 1,227 acres of Reclamation land. The "Yellow" "Red" and "Green" designations would be eliminated and the areas permanently closed to all motorized travel.

The closure and revegetation of 3.6 miles of primitive roads in the Upper Crab Creek Arm and East and West Lind Coulee arm management units would eliminate motorized vehicle access in the units.

The WDFW grazing program would be phased out and grazing eliminated on approximately 7,400 acres of Reclamation land.

Proposed "watchable wildlife" trail in the Lind Coulee North Arm would result in a small, undetermined conversion of vacant land converted to hiking trails, blinds and interpretive signage.

4.12.7 Alternative D - Recreation Development

Alternative D would result in the same impacts to land use and management activities as Alternative B, with the following exceptions:

Only the Upper West Arm management unit (1,964 acres) would be designated as a HMA, precluding future development in the area.

Two miles of primitive roads would be developed in the East Lind Coulee Arm, dedicating approximately two acres of vacant land to transportation use.

The land use agreement governing the Grant County ORV area would be retained, but with the stipulation that ORV use in the "Yellow Zone" be limited to existing roads and trails, removing 1,422 acres from recreational use. Impact to recreation users is discussed in the Recreation section of this chapter.

The designation of four ORV access routes between Sand Dunes Road and the west shore of Moses Lake and an access road between the O'Sullivan Site and the Eastern Dunes management unit would provide five new ORV access routes outside of the ORV area.

Unlike Alternative B, Powerline Road would remain open to motorized vehicle use, with no deviation from existing land use.

4.12.8 Mitigation Measures

No mitigation would be applied to Land Use.

4.12.9 Residual Effects

Residual effects are the same as those effects discussed for each alternative.

4.13 RECREATION

4.13.1 Introduction

The scoping process identified recreation and related activities as issues of primary concern in the adoption of an RMP. Many management actions directly address the need for improved recreation facilities and better access to popular recreation sites. Public involvement processes across the state indicate that people want to enjoy nature and to interact with wildlife. Non-consumptive activities such as wildlife observation are growing in popularity and require a degree of habitat preservation. (ICOR, 1995) At Potholes Reservoir, many people enjoy the area because of its scenic beauty and remoteness (Survey, 1999).

To varying degrees, management actions take into consideration the balance between resource conservation and protection with the needs of a growing recreation population. Based on concerns raised during the scoping process, this analysis identifies indicators of change to recreation resources and activities of concern. Impacts are measured by quantifying the degree of change that would result from proposed management actions to indicators of concern.

Issue/concern: Crowding and insufficient facilities during peak use periods

Indicators:

Change in the number of sanitation facilities (e.g., toilets, showers, RV dump sites)
Change in the number of recreation amenities (e.g., boat launches, courtesy docks)
Change in acreage of developed recreation areas

Issue/concern: Limitations imposed on recreation activities

I*ndicators:*

Change in acreage of areas dedicated to specific activities (e.g., ORV area)
Change in the number of days a given area is open for specific recreation activities

Issue/concern: Changes in recreation accessibility

Indicators:

Change in number of accessible boat launches (low and high water)
Change in number of ADA accessible facilities
Change in acreage of primitive roads open to motor vehicles

4.13.2 Summary of Effects

The availability, timing, ease or mode of access, and economic setting of recreation activities vary by alternative. Alternative D emphasizes recreation development and provides the highest number of developed recreation sites. Additional ORV access would be developed. Recreation would be focused and managed within environmentally suitable areas to reduce impacts and disturbances to sensitive habitat areas. Alternative B provides slightly fewer developed and dispersed recreation opportunities. ORV use restrictions could impact users accustomed to riding in the study area.

Under Alternatives A and C, the number of developed recreation opportunities would remain essentially unchanged, with some provisions for public safety and universal access. Alternative C closes more primitive and secondary roads to motorized vehicles than the other alternatives, and restricts public access in more management areas.

4.13.3 Effects Common to all Alternatives

In order to comply with existing laws and regulations, some management actions would be implemented with or without the adoption of an RMP. These actions, common under all proposed alternatives including the No-Action alternative, could result in impacts to recreation resources. For the most part, these impacts would be beneficial and long-term.

Camping

Developed Camping

A proposed 11- acre expansion of Potholes State Park, adjacent to the existing campground, would be developed when recreation demands exceed existing state park facility and site capacities and sufficient capital improvement funds are available. This action would result in long-term benefits by providing additional facilities to ease crowding and conflicts during high use periods. Proposed facilities and services include 100 individual campsites, several group campsites, restrooms, showers, parking, and trash collection.

Visitor Information

The WDFW and the WDOT would develop and administer Watchable Wildlife sites and interpretive trails as part of the statewide Watchable Wildlife Program. As feasible, wildlife viewing opportunities would be enhanced with the addition of Watchable Wildlife turnouts, signs and interpretive displays within the RMP study area. While the program in itself may increase public visitation, an increased public awareness of the wildlife and natural resource values present or unique to Potholes could indirectly reduce the adverse effects of dispersed, unstructured activities in some sensitive areas.

Access

The Americans with Disabilities Act (ADA) and Architectural Barriers Act require managing agencies to consider universal accessibility in all new developments and redevelopments. The construction of ADA-accessible facilities would allow more people, including those who rely on alternate forms of mobility, to enjoy waterfront recreation activities. The establishment of ADA compliant fishing sites, such as a new fishing pier at Potholes State Park, would increase public fishing opportunities, access, and visitor use within the study area.

A new asphalt bicycle and pedestrian path extending between Potholes State Park and O'Sullivan dam would provide a safe alternative to Highway 262 modes of travel in the developed corridor.

4.13.4 Alternative A - No Action

Outside of the Developed Corridor, dispersed unstructured activities would continue to typify public recreation at Potholes Reservoir. The WDFW and the SPRC implement actions to control dispersed camping in environmentally sensitive areas. Depending on the action, a small general reduction in the quality of recreation experiences is likely as more people use the reservoir and its shore areas, and conflicts among user groups increase. No effort would be made to comprehensively focus or direct public uses to specific areas better suited for long-term use.

Without a RMP to guide future management actions, visitor use would continue to cause resource impacts, creating a less natural landscape and detracting from the quality of the visitor experience. Damage in the form of soil erosion and vegetation loss due to overuse would become more evident particularly in sensitive, undeveloped areas. Dust, litter, and human waste problems would be intensified.

The No Action alternative includes specific resource management actions that would occur without the adoption of an RMP. In addition to the actions outlined above, common to all alternatives, the following actions would result in impacts to recreation users:

Camping

Dispersed Camping

The North Potholes Reserve management area (3,270 acres) would be permanently closed to dispersed camping except at the Job Corp Dike site. Because campers tend to use only the Job Corp Dike site for dispersed camping in this management area, impacts to campers would be expected to be low. Because Potholes State Park and Mar Don Resort are not popular dispersed camping sites, dispersed camping closures in these areas would result in minimal disruptions for campers who prefer a more primitive camping experience.

Visitor Information/Interpretation

A 1.7 mile vehicle trail in the North Peninsula management unit would utilize existing gravel roads and provide additional interpretive and educational opportunities, particularly to those who have difficulty navigating the area on foot, without additional impacts to sensitive habitat areas. Parking turnouts, blinds, and interpretive signs along the Lind Coulee North Arm in the West Lind Coulee management unit also would provide additional opportunities for wildlife observation and education within the study area.

Access

Powerline Road will remain "seasonally open" to motorized vehicle travel from July 1 through October 1. This action could negatively impact recreation users who are accustomed to driving into the northern portion of the study area from October to June to participate in non-motorized activities such as hiking or hunting.

4.13.5 Alternative B - Preferred

Under the Preferred Alternative, dispersed, unstructured activities would continue outside of the developed corridor at Potholes Reservoir. Seasonal and year-round primitive road closures would reduce "drive-in" public access opportunities. The designation of Habitat Management Areas would restrict dispersed camping to specified sites in sensitive habitat areas. In addition to the action common to all alternatives, Alternative B would have the following impacts to recreation resources:

Camping

Dispersed Camping

Seasonal and year-round limitations on dispersed camping within the RMP area would direct camping to designated sites, negatively affecting users accustomed to remote camping in these areas. Dispersed camping in the Upper West Arm and the Upper Crab Creek management areas (3,396 acres) would be limited seasonally to designated sites during the wildlife nesting and breeding season, March 15 through June 30. Within the 624-acre West Lind Coulee Arm and the 1,094-acre East Lind Coulee Arm management areas, dispersed camping would be restricted year-round to eight managed campsites. Within the 3,270 acre North Potholes Reserve management area, camping would be limited year-round to the Job Corp Dike site. The Eastern Dunes and Eastern Bluffs management areas, encompassing 799 total acres, would be closed year-round to dispersed camping, except in the designated campsites which are those waterfront sites currently most often used for dispersed camping. Because of this the seasonal and year-round closures would negatively affect only a small percentage of the overall users.

Developed Camping

In addition to the proposed 11-acre expansion of Potholes State Park, the preferred alternative proposes the development of the 80-acre O'Sullivan-North site as a unit of Potholes State Park. Phased facilities and amenities, fully described in Chapter 2, include a concrete boat ramp with a courtesy dock, 50-100 vehicle and trailer parking area, 80-100 campsites, a group campsite and restrooms. These additional facilities would ease crowding and congestion during the peak season, resulting in long-term beneficial impacts.

In the interim period prior to development, the O'Sullivan-North site would be closed to dispersed camping and managed as a day-use only site. This would result in immediate, short-term negative impacts to campers who are accustomed to using this popular dispersed camping area.

Fishing

The diked waters in the northern part of the lake would be managed as "carp-free" for blue gill and bass, providing long-term benefits for the area's fisheries.

Boating

The installation of courtesy docks at Glen Williams Boat Launch and the improvements at the cartop boat launch at Blythe Boat Launch would provide additional amenities to boaters.

Proposed provisions for periodic dredging at the base of public boat launches would improve boat access further into the season as the water level recedes.

Nature Study

The proposed development of four "watchable wildlife" opportunities in this altemative would provide additional opportunities for wildlife observation without impacting other recreation resources.

Off-Road Vehicle Use

A 919-acre portion of the"Yellow Zone" would be removed from the existing ORV area. Currently, the area is seasonally open to ORV use for three months of the year, from July 1 - October 1. User counts conducted during the recreation survey indicate that the area is not heavily used during the peak weekends of the open season. Only four groups over the peak weekends in the Yellow Zone as compared to approximately 320 in the Green Zone. Table 3-13.1 shows the ORV user counts conducted during the recreation sampling period.

The ORV boundary would be modified to include 320 acres of Reclamation land outside the RMP study area in the Eastern Dunes management area. Total area open year-round to ORV riding would remain at 2,435 acres.

Visitor Information

Visitor education and information opportunities would be expanded under Alternative B including information kiosks, maps, signage, "watchable wildlife" sites, and the development of an "Environmental Education Center" This would provide direct and indirect benefits to recreation users at Potholes.

Access

All public access would be prohibited in the south/central portion of North Potholes Reservoir (3270 acres) from March 15 through May 30 (77 days). Few people (2 groups) have been observed using this area during the proposed off-season closure. Therefore, impacts would be limited to a small percentage of recreation users.

Alternative B would permanently close 18.5 miles of primitive roads, and seasonally close 1.5 miles of the primitive road system to motorized travel. Approximately 40 miles of primitive road would remain open to motorized travel.

Installation of "No Parking/No Camping signs at the Powerline Boat Launch will improve vehicle access and circulation to that site.

The eastern portion of Powerline Road would remain open year-round to motor vehicle travel and ORV access.

Developed Recreation

As requested by survey respondents, three temporary toilets and one permanent vault toilet would be placed strategically at high-use areas during the peak recreation months, providing more convenient access to more users and reducing the occurrence of inappropriate waste at busy sites.

4.13.6 Alternative C - Preservation/Enhancement

Of all the alternatives, Alternative C provides the fewest developed facilities and the most restrictions to motorized vehicles and public access. Alternative C has the same impacts as Alternative B, with the following exceptions.

Camping

Dispersed Camping

Dispersed camping would be prohibited in nine management areas within the RMP area, closing 6,529 acres of land to dispersed camping. Seven popular dispersed campsites would remain open (see Figure 2-6.1 and 2-6.2 for specific site locations). This action would affect a small percentage of users who prefer to camp in the area's more remote areas and could increase crowding at the seven designated sites during high use periods.

A reservoir-wide 10-day stay limit would be adopted and enforced for dispersed camping, unless posted otherwise. This would deter "squatting" at prime hunting spots, and allow better access to campsites for more individuals.

Developed Camping

No developed recreation area would be constructed at the O'Sullivan Site. Instead, the area would be transferred to the WDFW and managed for dispersed camping and day use. Beneficial impacts include the addition of two permanent vault toilets, centrally located in the O'Sullivan Beach area. Access to the area would remain essentially the same. Dispersed camping would continue, positively affecting those users who prefer a more natural-looking landscape. As more and more users utilize Potholes Reservoir, this area may become degraded and less appealing for dispersed recreation activities.

Boating

Periodic dredging and removal of sediments deposited at the base of public boat launches within the Developed Corridor would allow better boat access during the late summer when the water level drops. However, dredging would not occur as often as in Alternatives B and D.

Motorized watercraft would be banned in the Upper West Arm and Upper Crab Creek Arm year round. Year-round minimum wake operation in Peninsula South and East Lind Coulee Arm and seasonal minimum wake operation, from April 15 through June 30, in the Dunes/Sand Islands would effectively prohibit PWC use in these areas. The visitor survey indicates that power boating and PWC riding are not popular activities in these areas, therefore only a few users would be impacted.

Proposed provisions for periodic dredging at the base of public boat launches would occur only in the Developed Corridor. Beneficial impacts are described in Alternative B under boating.

Nature Study

The proposed half-mile interpretive trail in the West Lind Coulee Arm would provide additional opportunities to view migrant shorebirds and concentrations of waterfowl during late summer and early fall when mudflats become exposed. This would provide hikers and bicycle riders new opportunities for wildlife viewing without disruption from motorized traffic.

The cancellation of grazing permit TO-01 would remove cattle from 7,400 acres of prime bird watching areas in North Potholes Reserve, improving wildlife watching opportunities.

Off-Road Vehicle Use

Under this action, 1,895 acres of land currently open to ORV use in the Green Zone would be closed. Modified land use agreements with Grant County would open 1,227 acres of Reclamation land for ORV use outside the RMP area, resulting in 668 fewer acres open for ORV use.

Access

Alternative C includes actions that would limit motor vehicle access into sensitive RMP areas, decreasing habitat degradation due to inappropriate recreation use. Approximately 7.5 miles of secondary roads deemed unnecessary for public or agency access would be closed in the North Potholes Reserve, Upper West Arm, Upper Crab Creek Arm, East and West Lind Coulee Arm Management Units. Impacts to recreation users would be limited to those users dependent on motorized vehicles for access into the area.

Four new hard-surfaced roadside turnouts on the east side of Sand Dune Road would provide several additional vehicle parking spaces. New trails from each turnout would channel visitors along properly designed and maintained trails from the road to the west shore of Moses Lake, facilitating day use activities such as fishing, hiking, picnicking, sunbathing, and wildlife observation (see Figure 2-6.1).

All public access to the south/central portion of North Potholes Reserve would be prohibited from March 15-May 30 to protect nesting waterfowl (see Figure 2-6.1). Because the area generally is not used during this period for recreation activities, impacts are expected to be negligible.

4.13.7 Alternative D - Recreation Development

Of the action alternatives, Alternative D provides the most developed and primitive recreation facilities and sites. This alternative would have the same impacts as Alternative B, with the following exceptions:

Camping

Dispersed Camping

This alternative restricts dispersed camping in the North Potholes Reserve, Upper Crab Creek Arm, Peninsula South, West Lind Coulee Arm, and Developed Corridor (8,560 acres total) year round to designated sites. The Visitor Survey indicates that few recreation users camp outside the designated sites, even on peak weekends. Impacts to recreation users would be limited to a few campers who prefer the most remote camping experience. Occasional crowding could occur at the designated sites on peak weekends.

Dispersed camping would be eliminated in the Upper West Arm, Eastern Dunes, Eastern Bluffs, and East Lind Coulee Arm (3,857 acres). This would affect ORV users and others accustomed to camping in the area.

Boating

Minimum wake operation in Peninsula South, Upper West Arm, Upper Crab Creek Arm, and East Lind Coulee Arm would prohibit PWC use in these management units. The visitor survey indicates PWC riding is an occasional activity in these areas, therefore only a few users would be impacted.

The Powerline Boat Launch would be improved, with better parking and access provided to serve boaters with trailers. The Job Corps Dike Boat Launch would be improved, providing better access to more boaters.

In addition to new docks at Glen Williams Boat Launch, additional courtesy docks would be provided at Blythe Boat Launch.

Nature Study

In addition to the "watchable wildlife" features outlined under Alternatives A and B, this alternative proposes the development of a 3.5 mile trail between Potholes State Park and the Winchester Wasteway. Alternative D proposes five "watchable wildlife" sites in all. These sites provide additional and varied recreation opportunities for hikers and sight-seers with minimal conflicts with other recreation activities or natural resources.

Off-Road Vehicle Use

The current management of ORV use would continue under Alternative D with the exception of Yellow Zone management. The area would remain seasonally open, but ORV use would be restricted to existing trails and roads. This action would remove 1,422 acres from ORV use, but would have minor impacts as few riders leave the trail in the area.

Access

The development of an ORV route between the Eastern Dunes Management Area and the O'Sullivan Site would provide additional, convenient access to the ORV area for campers. This action would deter trespass and the proliferation of random trails across natural habitat areas.

Alternative D would permanently close 13 miles of primitive roads, and seasonally close 1.5 miles of the primitive road system to motorized travel. Approximately 46 miles of primitive road would remain open to motorized travel.

Developed Recreation

As requested by survey respondents, three temporary toilets and three permanent vault toilets (two more than in Alternative B) would be placed strategically at high-use areas during the peak recreation months, providing more convenient access to more users and reducing the occurrence of inappropriate waste at busy sites.

4.13.8 Mitigation Measures

No mitigation would be applied to recreation specifically. Other resources may have mitigation applied relative to recreation but would not effect recreation specifically.

4.13.9 Residual Effects

Residual effects are the same as those effects discussed for each alternative.

4.14 SOCIAL AND ECONOMIC RESOURCES

4.14.1 Introduction

Understanding that every community is unique, each with its own identity and history, this analysis provides an estimation of possible social and economic effects that may be expected at the community level if different alternatives presented were implemented. The indicators listed below are used to evaluate how each alternative address the sociological and economic issues and concerns based on public involvement.

Issue/Concern: Changes in the type and amount of recreational use, public access, outputs, and commodities could have an effect on local social acceptability of the actions.

Indicators:

Individual and group acceptability of change
Changes in recreational use and recreation-related income and expenditures
Changes in personal income growth

Most of the communities in close proximity to the project area are specialized in irrigated and non-irrigated agricultural lands consisting primarily of crops and pasture. Water consumption and allocation are not within the scope of this analysis; therefore, the effects of the alternatives on communities specialized in private land and agriculture are limited. Recreational use and management of the Potholes Reservoir and surrounding area could affect private user groups, state and local revenues, and service business economics.

4.14.2 Summary of Effects

Based on user surveys (see Recreation 3.13) a qualitative assessment of how recreational users would accept changes in the management of Potholes Reservoir has been displayed. It is necessary to understand that these values are reflective of the people who recreate in the Potholes area and only give some indication of the people who live within Grant County. We must understand that the social and economic bases for the Grant County area are agriculture and not recreation. Some individuals and user associated groups would tend to benefit from changes in the use and type of recreation that is available. Those individuals and groups have been considered within this analysis.

This analysis assessed the value that individual or groups place on the existing condition and what is acceptable for change. Using the effects indicators, specific management actions, and user surveys we can establish the acceptability for change of management actions and compare that acceptability to the degree of physical recreational changes and improvements.

The economic portion of the impact assessment describes personal income growth from the broad scale and recreational expenses and income for the project area only. Some individuals and groups may benefit economically from recreational and general improvements in the Potholes area. However, overall personal income growth, changes in unemployment, increase in jobs would only be affected slightly within the Grant County area. Populations are expected to increase and agricultural based economics are expected to flourish and fluctuate with the amount of available water.

Below is a table comparing the direct and indirect effects of the actions by alternative. Low, Moderate, and High indicate comparison between alternatives, NC is no change:

Table 4.14-1
Comparison of Impacts

	Alternative A	Alternative B	Alternative C	Alternative D
Recreation Improvements				
- Acceptability of Change	M	M	L	H
- Change in Recreational Use	NC	M	H	H
- Cost of Recreational Change	M	M	L	H
	NC	M	NC	M
- Personal Growth Income	NC	NC	NC	NC
Off Road Vehicle Use				
- Acceptability of Change	H	L-M	L	H
- Change in Recreational Use	NC	L	H	H
- Cost of Recreational Change	NC	M	L	H
- Change in Recreational Income	NC	M	M	H
- Personal Growth Income	NC	NC	NC	NC
Visitor Information				
- Acceptability of Change	L	M	M	M
- Change in Recreational Use	NC	M-H	M-H	M-H
- Cost of Recreational Change	L	M	M	M
- Change in Recreational Income	NC	M	NC	NC
- Personal Growth Income	NC	NC	NC	NC
Public Health and Safety				
- Acceptability of Change	M	M	M	M
- Change in Recreational Use	NC	L-M	L-M	L-M
- Cost of Recreational Change	L	M	M	M
- Change in Recreational Income	NC	M	M	M
- Personal Growth Income	NC	NC	NC	NC

4.14.3 Effects Common to All Alternatives

Several socio-economic effects or impacts can be considered to be common to all alternatives. The following aspects of socioeconomic in communities surrounding the Potholes Reservoir would incur no effects as a result of any alternative selected.

Private lands would not be affected directly by any of the alternatives.
Water allocation and use would not be affected by any of the alternatives.
Consultation and advice would be provided by other Federal, State, and local agencies where appropriate, enforcing various laws and regulations such as those dealing with the ESA, Clean Air and Water Acts, and State hunting and fishing regulations.
American Indian treaties, agreements, and access would remain intact under all alternatives.
Agricultural leases would not be affected by any of the alternatives.
Recreational lease agreements between SPRC and the Washington Department of Natural Resources would be maintained and/or expanded.
All existing MOUs would not be affected by any of the alternatives. This includes pest management, fire protection, Grant County Comprehensive Plan, Shoreline Master Program, and day to day resource and recreation management provided by SPRC and WDFW with Reclamation oversight.
None of the alternatives would affect personnel growth income on the broad scale. Service related and recreation oriented business would tend to experience small income growth from an increase in visitors to the area with all alternatives. Each of the alternatives could favor select group or individual businesses based on the type and amount of recreation activities proposed in each.

4.14.4 Alternative A - No Action

Recreation Improvements

Dispersed, unstructured activities outside the Developed Corridor would continue to typify public recreation at Potholes Reservoir. This would be a moderate level of acceptability to the general public based on public comment and user surveys. The general public tends to be satisfied with facilities overall at Potholes. However, those people surveyed felt upgrading of existing and new facilities would be beneficial (see Recreation, Section 3.13).

Recreational use would continue to grow in the Potholes area, and without plans or programs in place management would be on a reactionary bases. Recreational expenditures for management

agencies could increase due to this type of management. Reacting to problems or insufficiencies can be less cost effective then planning and implementation based on known or anticipated needs. Recreation income would remain the same until future expansion was warranted. User satisfaction is likely to decline with increased use and lack of adequate facilities to accommodate this use.

Off Road Vehicle Management

The current management practices and zone restrictions would continue under Alternative A. No new areas would be designated "open" nor would season-of-use change. This would be a moderate to high level of acceptability, but would be more acceptable to the ORV individuals and groups which are a large component of the recreating public in the Potholes area. There would be no immediate change in ORV recreational use unless changed conditions mandated the need. This would also be considered reactionary management and is likely to be more expensive over the long-term. There would be no change in recreational income as a result of off road vehicle management because facilities would remain the same.

Visitor Information

Alternative A would provide a minimum of managed access, turnouts, signs, brochures and/or interpretive displays to enhance trails, roads, and wildlife areas. Public surveys demonstrate a moderate acceptability of the existing visitor information. There would be a low expense associated with this alternative and little or no change for recreation use and income.

Public Health and Safety

Public surveys indicate a moderate acceptability of existing restroom and sanitation facilities. Most thought that more would be "good" but did not perceive a problem with the current condition. This alternative and management action would not change recreation use over the short-term. Recreation expense would be "low" based on minimum facility needs and recreational income would remain the same.

4.14.5 Alternative B - Preferred

Recreation Improvements

Areas of recreational activities would change in location and type. The amount of available areas for dispersed camping, developed camping, and developed recreation sites would remain the same or increase slightly. Locations for dispersed camping would be designated varying degrees of improvements under the preferred alternative. This would be considered a moderate degree of acceptability, a moderate change to recreational use within the area, a moderate increase in recreational expenses, and a moderate degree of change in recreation income.

Alternative B would provide a balanced diversity for types and amounts of recreational improvements and wildlife habitat needs. It would tend to favor the general public but also provide adequate areas for specific groups and individuals (fishing, developed sites, wildlife viewing, etc.).

Off Road Vehicle Management

Additional zone restrictions and closures would be in effect for ORVs as a result of Alternative B. Although, the acres of available area changed would be small, general acceptability would be low to moderate due to the loss of the Yellow Zone. This would affect specific individuals and groups both from a high degree of acceptability to a low degree based on expectations and needs and would also cause a low change in recreational use, expenditure, and income within the project area based on changes in location, types, and amounts of ORV areas.

Visitor Information

Increases in visitor education, interpretation areas, signs, trails, and displays to enhance watchable wildlife areas would have a moderate degree of acceptability and require a moderate degree of expenditure. A moderate to high degree of change in recreation use because of these enhancements could be expected. This would require a moderate expenditure with a moderate change in recreational income (Chapter 2, Alternatives for specific actions). Some user groups might find the area more attractive based on the expanded educational and information facilities.

Public Health and Safety

Alternative B would provide for public health and safety by facilities improvements, designated and restricted recreational use, improved waste disposal, and resource enhancement. A moderate to high degree of acceptability for the general public is expected based on the user surveys. This would require a moderate expenditure with an expectation of a moderate change in recreational income based on new development and higher costs for use of those areas. Recreational use could change slightly due to the upgrades. Some user groups might find the area more attractive based on the expanded public facilities.

4.14.6 Alternative C - Preservation/Enhancement

Recreation Improvements

Dispersed camping would be designated with improvements under alternative C. Areas of recreational activities would change in location, restrictions, and type. Alternative C would have fewer available dispersed or developed camping areas than Alternative B. Areas would be designated for habitat management and preservation. Some individuals and groups would consider this a high degree of acceptability, however, based on the surveys this would be considered a low degree of acceptability to the general public who is comfortable with the current facilities or would like to see them expanded for use. This would be considered a high change to recreational use within the area, a low increase in recreational expenses, and a moderate change recreation income due to a "loss" of revenues from area closure and ability for the area to accommodate expected groups.

Alternative C would provide the less diverse types and amounts of recreational improvements than alternative B and provide for more areas of wildlife habitat restoration and preservation. It would tend to favor those individuals or groups preferring habitat, wildlife and natural preservation. This alternative would provide areas for specific groups and individuals on a limited basis.

Off Road Vehicle Management

Additional zone restrictions and closures would be in effect for ORVs as a result of implementing Alternative C. The acres of available area lost would be greatest in this alternative. General acceptability would be considered low. This would affect specific individuals and groups both from a high to a low degree of acceptability based on expectations and needs. This would also cause a high degree of change in recreation use, a low degree of

change in expenditure, and a high degree of change in income within the project area based on changes in location, types, and amounts of ORV areas and revenues lost from recreational spending.

Visitor Information

Based on the user surveys, increases in visitor education, interpretation areas, signs, trails, and displays to enhance watchable wildlife areas would have a moderate degree of acceptability and require a moderate degree of expenditure. The improvements in Alternative C are greater than in alternative B and less in Alternative D. The change between the alternative is relatively small and not a measurable difference. A moderate to high degree of change in recreation use because these enhancements could be expected based on the rational in Alternative B. This would require a moderate expenditure with no change in recreational income.

Public Health and Safety

Alternative C would provide for public health and safety by facilities improvements, designated and restricted recreational use, improved waste disposal, and resource enhancement. A moderate to high degree of acceptability for the general public would be concluded base on the user surveys. This would require a moderate expenditure with an expectation of a moderate change in recreational income based on new development and higher costs for those areas. There would be low to moderate change in recreational use from these upgrades, similar to Alternative B.

4.14.7 Alternative D - Recreation Development

Recreation Improvements

Dispersed camping would be designated with improvements and areas designated would increase with alternative D. Areas of recreational activities would change in location, restrictions, and type while habitat management areas would decrease as compared to Alternatives A, B, and C (see Recreation Chapter 4). This would be considered a high degree of acceptability to the general public and recreational users surveyed in the Potholes area. The amount of available areas for dispersed camping, developed camping, and developed recreation sites would increase over alternative B and C. This would be considered a high degree of change to recreational use within the area, a high increase in recreational expenses, and a moderate increase in recreation income.

Alternative D would provide the most diverse types and amounts of recreational improvements and the least amounts of wildlife habitat restoration or preservation. It would tend to favor those individuals or groups preferring unrestricted recreational opportunities. This alternative would provide areas for specific recreational groups and individuals on an unlimited basis.

Off Road Vehicle Management

Zone restrictions and closures would be minimal for ORVs with Alternative D. This alternative would have the greatest amount of acres available for ORV use with the less amount of restrictions and closures. General acceptability would be considered moderate to high, and would tend to favor specific individuals and groups. This would also cause a high degree of change in recreation use due to the expanded area, a high degree of change in expenditure in costs of administration and recreational improvements, and a high degree of change in income within the project from expanded ORV locations, types, and amounts.

Visitor Information

Based on the user surveys, increases in visitor education, interpretation areas, signs, trails, and displays to enhance watchable wildlife areas would have a moderate degree of acceptability and require a moderate degree of expenditure. A moderate to high degree of change in recreation use because of these enhancements would be expected. This would be the same as Alternative A, B, and C with slight variations. This would require a moderate expenditure with no expected change in recreational income.

Public Health and Safety

Alternative D would provide for public health and safety by facilities improvements, designated and restricted recreational use, improved waste disposal, and resource enhancement the same as Alternative B, and C with minor changes. A moderate to high degree of acceptability for the general public would be concluded base on the user surveys. This would require a moderate expenditure with an expectation of a moderate change in recreational income based on new development and higher costs for the developed areas. There would be little or no change in recreational use from these upgrades.

4.12.8 Mitigation Measures

No mitigation would be applied to Social and Economics.

4.12.9 Residual Effects

Residual effects are the same as those effects discussed for each alternative.

4.15 CUMULATIVE EFFECTS

4.15.1 Introduction

Cumulative impacts are those effects on the environment resulting from the incremental consequences of a proposed action when added to other past, present, and reasonable foreseeable future actions, regardless of what agency or person undertakes the other actions. The existing conditions are a product of past and current management activities on the landscape. Although when viewed individually these activities may have minor effects, collectively they may constitute a significant effect particularly when added to future know actions.

This assessment will establish the existing conditions based on past, present, and future known activities. Chapter 1 outlines other management plans that will be implemented in conjunction with this RMP. The elements of these plans and this RMP will be assessed for their cumulative affects on each resource.

Past

The past activities within Central Washington have contributed to the existing conditions in Potholes Reservoir or in some respects created those conditions. The Columbia Basin Project fueled extensive growth in Grant County's agricultural industry. Agricultural industry has led to growth in complementary industries such as food processing, agricultural services, warehousing and trucking. In terms of farm-gate production value, Grant County is the second largest in the State. The formation of Potholes Reservoir has increased the recreational draw of the area.

The agricultural industry is the economic and social bases for the communities in Grant County and has been since the completion of Grand Coulee Dam in 1942 and the creation of Potholes

Reservoir. The past has set the stage for management of residual opportunities and industries associated with recreation, wildlife conservation, fishing, and water sports.

Present

Many communities have been able to gain benefits from the attractions on Federal lands. All Alternatives in the Final Environmental Impact Statement (FEIS) would provide for the current and future management of Potholes Reservoir with minor effects to the resources, culture, customs, social and economic bases of Grant County. The RMP would provide for changes in current recreation use, habitat conservation, and land administration.

The Reclamation and the State of Washington are currently involved in several related projects and activities which could affect future resource conditions and management decisions at Potholes Reservoir. Similarly, other agencies are also involved in a range of activities that may have a bearing on Potholes Reservoir resource conditions and management. The following actions have he potential to cause cumulative impacts in the study area. This RMP is consistent with the goals and objectives of these plans:

Grant County Comprehensive Plan
Columbia Basin Wildlife Area Management Plan
Grant County Shorelines management Master Program
Ground Water Management Area (GWMA)

Future Foreseeable

Population growth will be the dominant factor affecting recreation issues during the next 10 years, both in type and amount. In the longer term demographic changes will be increasingly important. The RMP that would occur after completion of the Potholes FEIS would direct the management of this area for the next 10 years. The direct and indirect effects would contribute to the cumulative effects for all resources in Potholes Reservoir. Population growth and increased pressure during that time period would have effects on the resources and social and economic structure of the area. Individual communities and the State of Washington are in the process of coordinating and directing recreational activities to meet this growth in the future. This RMP FEIS would contribute to the degree stated below to the cumulative effects, by resource in the area.

4.15.2 Air Quality

Since air pollution sources associated with each of the alternatives would be temporary, localized, and of small magnitude, no net adverse impact on air quality or ambient values in the Potholes area would occur. Overall, it is expected that diminished air quality during construction and maintenance operations and from visitor activities (e.g., campfires, fugitive dust, and internal combustion engine emissions) would have no effect on human health and would result in only a minor and temporary impairment in visibility and localized air quality. Short-term effects to air quality are expected but are considered minor. Overall actions would be consistent with maintaining air quality as the overall goal for this action and future foreseeable actions.

4.15.3 Soils

A net positive impact due to an overall decrease in soil erosion within the study area is expected under any of the RMP action alternatives. Alternative C would have the greatest benefit, followed by Alternative B and D. Although some minor reduction in soil erosion may be realized under the no action alternative, continued net adverse impacts are expected since most surface disturbing activities and erosion factors would continue unabated.

None of the action alternatives are expected to add cumulatively to soil impacts within the project or watershed area over the next 10 years. These actions are consistent with the projects outlined in Chapter 1 advocating resource protection. The RMP is consistent with the goals and objectives outlined in the Grant County Shorelines Management Master Plan for erosion control. This RMP is the only future foreseeable action that would require ground disturbance, therefore the direct and indirect effects are the cumulative total for the next 10 years.

4.15.4 Ground Water Quality

Minor effects from construction related projects can be expected for the ground and surface water quality. Current conditions in the Reservoir are within acceptable limits and are expected to stay as such. Overall, the net differences between the alternatives on ground water hydrology and function would be negligible and insignificant relative to the regional and shallow aquifer systems beneath the study area. Therefore, they would not contribute to the overall cumulative effects. The water in Potholes Reservoir will continue to be managed for irrigation purposes. Quality will be monitored and mitigation applied as needed to meet objectives of irrigation. The Ground Water Management Area (GWMA) group will use the RMP to help guide BMPs in the Potholes area.

4.15.5 Vegetation

Net positive impacts on vegetation are expected under each of the RMP alternatives. The greatest vegetation benefits would be realized under Alternative C, followed by Alternatives B and D, respectively. Alternatives B is expected to have a greater net beneficial effect than D due to a higher level of control, over uncontrolled dispersed camping, a higher level of habitat protection due to HMA designation, and the partial closure of the Yellow Zone to ORV use. Alternative C would have the greatest level of protection from the level of habitat protection.

The cumulative impact on vegetation is the impact which results when the incremental impact of each alternative is added to other past, present, and reasonably foreseeable future actions within or near the study area. Regardless of the alternative selected, the cumulative effect on vegetation would be positive since all of the alternatives would reduce to some degree the negative vegetative effects occurring at Potholes Reservoir. The net cumulative vegetative effect would be the same as described in Section 4.4.10.

4.15.6 Wildlife

Effects to wildlife species and habitat are directly related to vegetation loss or gain. Net positive effects on wildlife are expected under each of the RMP alternatives. The greatest benefit would be realized under Alternative C, followed by Alternatives B, D and A.

The cumulative impacts on wildlife are tied directly to vegetation. Regardless of the alternative selected, the cumulative effect on vegetation and consequently wildlife would be positive since all of the alternatives would reduce to some degree the negative habitat effects occurring at Potholes Reservoir. The plans for the Columbia Basin Wildlife Area management Plan did not incorporate any areas in Potholes Reservoir, however the preferred alternative will change some of the management units in the area to meet the goals and objective outlined in the plan. This would decrease the cumulative effects in the area for establishing wildlife habitat.

4.15.7 Fish

Alternative A would result in the least benefit to fish or aquatic resources. The negative impacts to fish populations associated with continued vegetation loss, sediment delivery to the reservoir, and dispersed camping are described under the individual alternatives. No impacts to fish or aquatic resources are expected with Alternatives B, C, or D. A net positive impact due to the development of Habitat Management Areas is expected regardless of the RMP alternative

selected. Overall, Alternative C would have the greatest positive impact due to improved riparian and shoreline conditions, and reduced use of sensitive habitat areas.

Any activity in a drainage that impacts fish populations and habitat affects population viability. Activities that occurred in the past effect populations and habitat today. Activities that occur today may affect future populations and habitat. Other activities in other areas have similar effects and these effects compound to impact fish production levels beyond that of a single action. Any alternative selected could add to the overall cumulative effects, positive and negative, to fish populations and habitat in the Columbia Plateau, however the actions in Potholes FEIS are designed to improve populations and habitat over the long-term. Cumulatively, any of the alternative selected would be an unmeasurable contribution to the overall effect.

4.15.8 Threatened and Endangered Species

No effect to threatened, endangered, or special status species is expected from implementation of the RMP Alternatives. The implementation of the actions in this RMP coupled with the actions outlined in Chapter 1 are not expected to affect species of special status. These actions are designed to reduce impacts to all resources and are developed with respect to each other. This action would not negatively add individually or collectively to special status species viability over time.

4.15.9 Cultural

All alternatives are designed to protect significant cultural resources. The ability to protect unknown or undiscovered sites is greatest in those alternatives in which ground disturbance is the least. Under No Action, dispersed camping would not be directed to specific sites designated and managed for “dispersed”, “boat in”, or “primitive” camping. Instead, this activity would continue to be allowed throughout the reservoir area (excluding the State Parks Management Zone). The action altematives would allow these activities in varying degrees. Alternative C would allow for the least restrictive while Alternative D would be the most. Alternative B would have a moderate restriction on these types of activities and add incrementally to the cumulative effects of loss of cultural properties in the area.

4.15.10 Indian Trust Assets

Opportunities for hunting, fishing, and gathering would continue, and would be enhanced due to improved management of resources. Under all alternatives some areas would be transferred to the administration of the SPRC, where hunting would not be allowed. Alternative D would transfer the most area, followed by Alternatives C and B.

On a landscape scale, additional benefits would be realized due to the additional RMP actions proposed to further protect the diversity of cultural resources present. This action is not expected to either singularity or collectively over time contribute to a significant effect on tribal rights in the area.

4.15.11 Visual Quality

Under the No Action alternative, negative effects on visual quality would continue due to the projected increase in human use and associated disturbance factors throughout the study area. Overall, resource conditions on a landscape scale are expected to decline since there would be little change in the disturbance factors affecting resource conditions and visual quality in the study area. Overall, the greatest benefits to visuals would be realized under Alternative C followed by Alternatives B, D and A, respectively.

Under all alternatives, the Potholes State Park expansion would result in a loss of 11 acres of natural-appearing shrub-steppe habitat. Visual contrast would be lessened by the siting of the new development directly adjacent to the existing park. Under Alternatives B and D, the addition of the O'Sullivan-North site would result in the loss of 80 acres of low quality, waterfront natural-appearing vegetation. Because the area is already disturbed by campers, and like Potholes State Park, is adjacent to existing development, the impacts to visual resources would be moderate to low. These acres could be considered a contribution to the cumulative total for visual alteration. This action is the only future foreseeable action that would effects visuals for the next 10 years.

4.15.12 Noise

Noise levels are expected to increase in the project area from increases in development, use, and population regardless of the alternative chosen. The differences between the alternatives are based on area restrictions and administration of sites. Alternative D would have the least

increase in noise followed by B and C. Alternative A would potentially have the greatest increase in noise.

This action would contribute to the area cumulative total for noise at the amount described in the impact assessment. The actions described in Chapter 1 and this action are designed to lessen effects on these resources. These actions added together would not have a significant cumulative effect on the area noise omissions.

4.15.13 Land Use

Table 4.12-1 compares the land use and administrative changes expected with each of the Potholes Reservoir alternatives. Impacts to recreation use are described in Section 4.13 of this chapter.

No cumulative effects from land allocation or administration would be anticipated from implementation of any alternative. Changes in land use would add incrementally to the cumulative effects for vegetation and wildlife. These effects are described in the appropriate chapters.

4.15.14 Recreation

The availability, timing, ease or mode of access, and economic setting of recreation activities vary by alternative. Alternative D emphasizes recreation development and provides the highest number of developed recreation sites. Additional ORV access would be developed. Recreation would be focused and managed within environmentally suitable areas to reduce impacts and disturbances to sensitive habitat areas. Alternative B provides slightly fewer developed and dispersed recreation opportunities. ORV use restrictions could impact users accustomed to riding in the study area.

Under Alternatives A and C, the number of developed recreation opportunities would remain essentially unchanged, with some provisions for public safety and universal access. Alternative C closes more primitive and secondary roads to motorized vehicles than the other alternatives, and restricts public access in more management areas.

The net or residual impacts expected with the implementation of an RMP would be as described in the Recreation section for each alternative. Regardless of the selected alternative, the range of recreation experiences and opportunities at Potholes would remain essentially unchanged.

Recreation actions would not result in any reasonably foreseeable cumulative impacts when added to the future foreseeable actions outlined in Chapter 1.

4.16 UNAVOIDABLE ADVERSE IMPACTS

Proposed activities would likely produce adverse effects on some components of the environment that cannot be avoided. For this project those are:

Minor losses of soil productivity from recreation improvement projects , roads and trails would occur.
Decrease in the acreage of ORV park except in Alternative D would involve a loss of ORV recreational area.
With the expansion of Potholes State Park losses of wildlife habitat are expected in that area, other areas will be managed for wildlife creating a net benefit overall for the project area.

All other impacts are deemed to be beneficial. Potential effects are documented in Chapter 4 and summarized in Chapter 2. A range of reasonable alternatives has been considered, and the alternatives include management requirements and mitigation measures to avoid or reduce these adverse environmental effects. A Monitoring and Evaluation Plan (Appendix H) will document the effectiveness of these requirements and measures.

4.17 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Long-term productivity refers to the capability of the land to provide market outputs and amenity values for future decades. The quality of life for future generations is linked to the capability of the land to maintain its productivity. The RMP will balance the needs of the area which will require short-term impacts for improvement projects (i.e. State Park expansion, wildlife trails). Project design features, management requirements, and mitigation measures are built into the action alternatives to ensure that long-term productivity or use would not be impaired by the application of short-term management practices. The RMP will depose 3,396 acres for habitat management. This will result in a short-term impact for recreation but a long-term beneficial impact for meeting resource values in the Potholes Reservoir area. For some resources--such as water quality and soils--long term productivity is expected to increase due to the short-term management improvement projects (water quality monitoring, erosion control, noxious weed control) proposed by the action alternatives.

4.18 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

NEPA regulations also state that the analysis must show any irreversible or irretrievable commitments of resources that may result from the alternatives.

Irreversible commitment is a permanent resource loss including the loss of future options. It usually applies to nonrenewable resources, such as minerals, or to factors that are renewable only over long periods, such as soil productivity.

Irretrievable commitment is the loss of use or production of a natural resource for some time. One example is suitable wildlife habitat being used for a road. Habitat growth or productivity is lost while the land is a road, but at some point in time could be revegetated.

An irretrievable loss of soil resources can be expected from the development of 1.7 miles of paved pedestrian and bike trail. The paved areas of the 11 acre campground expansion at Potholes State Park would represent an irretrievable loss, as would any paved areas accompanying the approximately 80 acre O'Sullivan Site development.

New roads, constructed trails, and developments are considered to be irretrievable commitments of soil productivity and hydrologic function, until these areas recover naturally or are restored to a productive state and function. Constructed stream crossings would be an irretrievable commitment of the resource for the life of the crossings. No irreversible commitments of resources are expected.

Continued ORV riding in the Green Zone is expected to result in an irreversible loss in the native plant communities and cover types remaining in this ORV management zone due to the fragility of the sand dunes present and the anticipated difficulty in restoring native plant cover even with active restoration.

2,435 acres (540 acres within seasonally open and 1,895 acres inside and outside the RMP boundary open year long) - Alternative B.

3,354 acres (1,459 acres within seasonally open and 1,895 acres inside and outside the RMP boundary open year long) - Alternative A and D.

1,227 acres (all outside the RMP boundary) - Alternative C

The management actions listed below would result in an irretrievable loss in the use or production of native vegetative resources.

- Develop O'Sullivan Site - North as a unit of Potholes State Park
  80 acres - Alternatives B and D

- Expand Potholes State Park
  11 acres - Alternatives A, B, C and D

- Develop a bicycle/pedestrian trail in Developed Corridor
  2.5 acres - Alternatives A, B, C and D

- Develop watchable wildlife interpretive trails
  0.3 acres - Alternatives B and C
  2.2 acres - Alternative D

- Continue WDFW agricultural lease program
  52 acres - Alternatives A, B, C and D

- Reopen or provide additional primitive roads/trails for year-round motor vehicle travel
  1.5 acres - Alternative B
  9 acres - Alternative D

CHAPTER 5
PUBLIC INVOLVEMENT AND AGENCY CONSULTATION

5.1 OVERVIEW OF PUBLIC INVOLVEMENT PROGRAM

A comprehensive public involvement program was developed and implemented by the Reclamation study team as a cornerstone of the Resource Management Plan (RMP)/Final Environmental Impact Statement (FEIS) study process. A series of public mailings, public meetings, ongoing collaboration with the Land Management Agency and Ad Hoc Agency work groups, and discussions with Native Americans were undertaken to bring forth issues and concerns, formulate a set of RMP goals and objectives, and establish the range of alternatives to be studied and evaluated.

In order to provide an opportunity for review and comment Reclamation conducted a Potholes DEIS public hearing on March 13, 2001, at the Midway Learning Center in Moses Lake, Washington, to hear and record the public's comments after review of the DEIS..

5.2 PUBLIC MAILINGS

The mailing list from the *Continued Development of the Columbia Basin Project Environmental Impact Statement*, comprising approximately 2,500 individuals, groups and agencies, was used to develop an initial contact base for the RMP public involvement program. The SPRC provided an additional list of 1,500 individuals who had secured camping reservations at Potholes State Park, either through the toll-free reservation number or walk-up registration.

Using this exhaustive mailing list, the first public mailing took place the last week of August 1996. The purpose of this first mailing was to introduce the Potholes Reservoir RMP project, announce the date and time for an initial set of public meetings, and solicit public scoping comments on the issues and concerns needing attention during the RMP/FEIS study process.

Public mailings preceded each public meeting and were used to highlight identified RMP issues, goals and objectives, resource constraints, and future opportunities for public input. The mailing list was selectively reduced by retaining those groups and individuals who requested to remain on the mailing list. Those individuals and groups who did not specifically respond to this request were removed from the mailing list.

Newspaper announcements were sent to Moses Lake's *Columbia Basin Herald*, Royal City's *Royal Review*, Ephrata's *Grant County Journal* (including Soap Lake, Mattawa, and Wilson

Creek), Coulee City's *News Standard*, Quincy's *The Post Register*, Tri-Cities' *Herald*, the Seattle *Times* including the east-side edition, Seattle's *Post-Intelligencer*, and Bellevue's *Journal American Times & East-Side Weekly* to notify the public of the upcoming public meetings and to present a brief description of the RMP study effort. Chambers of Commerce in Ephrata, Royal City, Soap Lake, Quincy, Bellevue, and Seattle were also contacted.

5.3 KEY OPINION LEADERS

Comprehensive telephone interviews were conducted with ten key opinion leaders in late August 1996. These key leaders were identified through discussions with the Land Management Agency work group and included: the Columbia Basin Walleye Club, Moses Lake Chamber of Commerce, Othello Chamber of Commerce, Potholes Bass Club, Sand Commandos, Perch Point Resort, Moses Lake Audubon Society, Ducks Unlimited, Cascade Marina, and Mar Don Resort. The interview results emphasized a plethora of issues and concerns needing attention at Potholes Reservoir. These results were combined with the initial input received from the Land Management Agency work group, and used to establish a preliminary list of RMP issues, concerns, and problems. These key opinion leaders were also invited to participate in other public involvement opportunities made available during the RMP/FEIS study period.

5.4 PUBLIC MEETINGS

A series of three public meetings were held in September 1996, June 1997, and December 1997. The first set of meetings was held in Bellevue and Othello, WA to introduce the project and solicit public scoping comments, issues and concerns. Two public meeting sites were selected. The Bellevue site was chosen because of the strong presence of western Washington users at Potholes Reservoir and the Othello site was chosen to attract the local, full-time resident user.

A second public meeting was held in Moses Lake in June 1997. Located immediately northeast of Potholes Reservoir, Moses Lake was selected based on guidance provided by Reclamation that future public meetings be held in Eastern Washington, in the immediate vicinity of the local resident user. Other users would continue to be contacted through public mailings and asked to provide their comments and input via written, verbal, facsimile, and/or email.

The June 1997 meeting continued the scoping process by providing an additional opportunity for public input on issues, problems, and concerns. To keep the public abreast of the RMP study effort, the study team reviewed the draft RMP goals and objectives, resource inventory findings, and the suitability/constraints analysis results. The meeting participants were then asked to rank

resource values and help identify specific management actions to be considered and evaluated in the RMP alternatives.

The RMP goals and objectives were refined with additional input provided by the Ad Hoc Agency work group and other interested publics. A preliminary list of goals and objectives were developed by the Land Management Agency work group and distributed by mail to the revised mailing list, Ad Hoc Agency work group members, and to Reclamation for distribution to the Indian Nations. Based on the comments received, a "Final Goals and Objectives" document was completed in February 1997 (see Appendix A) and used to direct the alternatives development process which followed.

The third public meeting was held on December 10, 1997 in Moses Lake. The purpose of this meeting was to present and receive substantive feedback on the range of alternatives being considered. Prior to the meeting, those on the mailing list were sent a summary of the four alternatives being considered for their review and comment. The public meeting was designed to gather input on the overall bounds of the management actions contained in the alternatives, and to review the reasonableness of the alternatives to determine if additional revisions were necessary prior to finalizing them and completing the preliminary impact assessment.

Comments were received at the meeting and the comment period extended through January 31, 1998. The comments received were used to further refine the alternatives and specific management actions contained and detailed within the alternatives.

5.5 LAND MANAGEMENT AGENCY WORK GROUP

A Land Management Agency (LMA) Work Group, consisting of representatives from Reclamation, WDFW, SPRC and the Grant County Sheriff's Office, provided critical input throughout the RMP/FEIS study process. This input was received through LMA work group meetings as well as one-on-on agency contact and consultation with the study team. Since these agencies are directly responsible for the day-to-day management and law enforcement activities within the study area, LMA participation was particularly instrumental in identifying the goals and objectives used to complete the alternatives development process. Their participation also provided the agency perspective, direction, guidance and input needed to insure that the alternatives developed addressed the breath of issues and concerns identified.

The Reclamation study team reported back to the work group following public and individual agency meetings to keep the LMA abreast of all activities and input received. The work group was invaluable in helping Reclamation establish reasonable, balanced and workable management

actions. These actions were ultimately combined into the four alternatives being considered and evaluated in this FEIS.

Following Reclamation's September 1998 decision to prepare an FEIS rather than an Environmental Assessment for the Potholes Reservoir RMP, a considerable period of inactivity lapsed while Reclamation negotiated a scope of work supplement with their contractor.

LMA involvement was reinitiated in June 1999, when a letter was sent to all work group members announcing a July meeting. At this meeting, the LMA members discussed in detail what changes or added features were needed to bring the range of alternatives to an FEIS level of detail for study. Individual agency meetings were also held. The WDFW met with the Reclamation study team in early September to further define some of the specific management actions sought by the Department. Based on the outcome of the September meeting, "watchable wildlife" features and Habitat Management Area concepts were added to the alternatives. Similarly, a November meeting was held in Wenatchee, WA with the SPRC to define and fine-tune the concept plans envisioned for the Potholes State Park and O'Sullivan Site expansion projects.

All the changes made to the alternatives during this June 1999 through February 2000 time frame were compiled and detailed in a draft "Alternatives" chapter for the FEIS. A draft of this chapter was circulated for LMA review in January 2000 prior to a final LMA meeting in early February 2000. Based on the input received at the February 2000 meeting, the alternatives presented in this FEIS were finalized.

5.6 AD HOC AGENCY WORK GROUP

An Ad Hoc Agency Work Group was established to bring together all of the agencies associated with Potholes Reservoir, and to act as a sounding board for the LMA work group. The Ad Hoc Agency Work Group consisted of a broad cross-section of resource, Tribal, and local agency personnel (e.g., U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, the CBP Irrigation Districts, Grant County Noxious Weed Control Board, WDNR, and others).

The primary focus of the Ad Hoc work group was to bring together groups and agencies often with disparate and competing views and interests. This group also acted as a sounding board for the study team to present issues, goals and objectives, and ultimately, the range of alternatives developed by the LMA work group. Ad Hoc work group meetings were typically scheduled to follow public meetings, so that a sense of the public comments and concerns could be expressed to those Ad Hoc members unable to attend the public meetings.

Ad Hoc work group involvement was reinitiated in June 1999, when a letter was sent to all work group members announcing a July meeting and summarizing the existing range of alternatives. At the July meeting, the work group discussed what changes or added features were needed to bring the range of alternatives to an FEIS level of detail. All the changes made to the alternatives from June 1999 through February 2000 were detailed in a draft "Alternatives" chapter and circulated for work group review in January 2000 prior to a final meeting in early February 2000. Based on the input received at the February meeting, the FEIS alternatives were finalized.

5.7 NATIVE AMERICAN COORDINATION

Reclamation initiated direct contact with the Confederated Tribes of the Colville Reservation, the Confederated Tribes of the Yakama Indian Nation, and the Spokane Indian Tribe. Invitations to Public Scoping, Adhoc Meetings and Land Management Agency Groups were sent to tribal affiliates at all dates mentioned above. Native Americans with interests at Potholes Reservoir would be consulted, as appropriate, to identify, protect, or mitigate effects to sacred or traditional cultural properties.

5.8 STATE HISTORIC PRESERVATION OFFICER CONSULTATION

Cultural resource investigations and consultations for developments proposed in the areas not previously surveyed have been conducted. In most cases if cultural resources are present in a proposed development area actions would include, avoidance of the site, or, if avoidance is not possible, avoid or minimize the adverse effect(s) with appropriate management or mitigative actions. Management actions would be defined in a Memorandum of Agreement with the Washington State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (the Advisory Council). Consultation would be completed with the SHPO on all surveyed and impact assessments.

5.9 SPECIAL STATUS SPECIES CONSULTATION

Letters were received from the U. S. Fish and Wildlife Service in August 1996 and March 1997 identifying a list of species protected under the Endangered Species Act with the potential to occur in the study area. Records of state priority species and habitats found at Potholes Reservoir were requested from WDFW and the WDNR Natural Heritage Program. The contacted agencies conducted a search of the WDFW Nongame database, the Priority Habitats and Species database, and the Natural Heritage Data System at WDNR, and provided the study team with the results.

Local biologists with the USFWS and WDFW were contacted for more in depth discussions on federal and state listed special status species occurrences in the study area. WDFW and other local biologists were contacted for specific information on species occurrences and use of the area. Potential habitat was assessed during two field visits and with the aid of aerial photography and consultation with local state and federal agency biologists.

On February 28, 2000, U. S. Fish and Wildlife Service (Service) letter of concurrence with the determination of "may affect, but are not likely to adversely affect" bald eagles. The letter stated that the Draft Environmental Impact Statements (DEIS) would serve as the Biological Assessments (BA) for activities proposed by Reclamation.

This concludes informal consultation for species under the purview of the Service pursuant to Section 7 of the Endangered Species Act of 1973, as amended (Act). This project would be re-analyzed if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this consultation; and/or, if a new species is listed or critical habitat is designated that may be affected by this project.

5.10 FISH AND WILDLIFE COORDINATION ACT

The Reclamation study team maintained close contact with the FWS throughout the RMP/FEIS study period. As a member of the Ad Hoc Agency work group, the FWS was kept informed of all study activities and able to actively participate in, and provide comments on, all study activities and products. This forum also allowed the Service to provide their perspective on management actions and issues important to wildlife resources at the reservoir.

Direct communication between the study team's biologists with the Service was maintained throughout the study effort. Of particular value was the cooperative and integrated approach used to complete the necessary field studies and resource inventories required to prepare this FEIS and conduct the Service's Habitat Evaluation Procedures (HEP) study.

In accordance with the Fish and Wildlife Coordination Act (48 Stat 401, as amended, 16 U.S.C. 661 et seq.), the FWS provided the Reclamation a draft Planning Aid Report in January 1999 documenting the preliminary findings of the Service's HEP analysis conducted in 1999. The objective of the HEP study was to quantify and describe current wildlife habitat conditions on Special Areas of Concern (SACs) and on adjacent control sites. SACs were defined as those areas under consideration by Reclamation for management changes under the RMP alternatives

such as the "Red," "Yellow," and "Green" Zones within the Grant County ORV area, Job Corps Dike, O'Sullivan Site - North, Lind Coulee Arm (East and West), and the Dunes/Sand Islands areas.

A final Planning Aid Report was submitted to Reclamation on March 24, 2000, and provided additional information gained through the Service's HEP analysis. The purpose of the HEP study was to identify (1) baseline data on current habitat conditions, (2) impacts from recreational use on wildlife/vegetative communities, (3) project habitat changes from the RMP alternative actions based on the HEP analysis, and (4) management recommendations. The March report addressed the first and second goals of the HEP study and set aside the third and fourth goals for the subsequent Coordination Act Report to be prepared by the Service.

A Draft Coordination Act Report was submitted to Reclamation on April 14, 2000 and a final on July 21, 2000 to assist in the preparation of the Potholes Reservoir RMP/FEIS. The report detailed the Service's perspective on impacts to wildlife resources and habitats at Potholes Reservoir with each of the RMP/FEIS alternatives. The final report identifies and recommends mitigation measures to reduce or minimize potential adverse impacts on wildlife.

Reclamation agrees with all mitigation and recommendation as outlined in the CAR except as noted below:

5.10.1 Mitigation Recommendations

Mitigation actions for some adverse impacts could include restoration of native vegetation in various portions of the project area. For example, because of the slow recovery of plant communities from disturbance in this area, more active efforts may be needed in areas set aside for preservation. Restoration efforts under mitigation should be tied to monitoring and success criteria. That is, if initial restoration actions fall short of goals, additional actions would be necessary.

Response: Managing agencies will be encouraged to make their best efforts to restore native vegetation in those areas identified for restoration.

Aside from simply revegetating closed roads, trails, closed ORV areas and other disturbed areas, efforts could be make to attempt to restore native plant "communities". This would be a much more difficult goal to attain, especially in this region.

Response: Every attempt will be made to meet the objectives of the RMP for habitat restoration.

More aggressive weed control plans, above and beyond simply noxious weed control measures, should benefit native plant communities.

Response: It is not anticipated that the managing agencies, with financial assistance from Reclamation, will be more aggressive in attempting control of non-native plants. It is believed with the limitation on funding and technology that such attempts may very well result in more damage to plant communities than benefits from control of the weeds.

The development of new campgrounds, boat launches, interpretive trails, etc. should take place in areas which avoid or minimize adverse impacts to fish and wildlife. That may mean using existing developed and dispersed sites whenever possible, even if these areas are not the most aesthetically-pleasing sites.

Response: Managing agencies would be directed by the RMP to meet the objectives of habitat protection for fish and wildlife when implementing any project.

Provide funding for additional law enforcement in the study area would help ensure various rules and regulations designed to protect habitat and fish and wildlife resources are being followed.

Response: It is not anticipated that Reclamation will provide funding for law enforcement in the study area. Managing agencies may, on their own, choose to direct more of their resources to protection of resources within the area.

Measures Aimed at Protecting Certain Species

...special signage, seasonal road closures, firearms or shooting restrictions, and some vegetation management are measures which may improve conditions for Washington ground squirrels near Lind Coulee

Response: It is believed that this recommendation is addressed within the FEIS with proposed actions for the Lind Coulee area.

...with ongoing research, management measures to protect and enhance northern leopard frog habitat may become known

Response: When additional information is available Reclamation will evaluate possible measures to protect or enhance the northern leopard frog's habitat.

...current locations of gray cryptantha could be identified and measures used to protect habitat components

Response: Reclamation will encourage the managing agencies to identify and protect gray cryptantha.

...because reproductive success for a large number of western and Clark's grebes appears to be low at Potholes Reservoir, and is likely due in part to recreational activities, Reclamation should fund a study which addresses these two species' ecology and potential impacts of recreation on them at Potholes Reservoir

Response: It is not anticipated that Reclamation will fund a study of grebes in the Potholes area. Reclamation might participate with our managing agencies in such a study.

Additional Recommendations

In several areas, there is reference to monitoring for response of habitat and fish and wildlife to certain management actions and strategies and that if warranted, making needed changes. It is important to ensure that monitoring protocols and schedules are clearly established, as well as standards for determining when management changes should be developed.

Response: Reclamation anticipates that the managing agencies will establish such procedures and recommend changes to management actions when warranted.

Some of the actions proposed under the various alternatives, such as development of additional State Park lands and the construction of various developments, should receive additional review and evaluation from the Service in the future, pursuant to the Fish and Wildlife Coordination Act.

Response: When major activities occur Reclamation will consult with the Service.

The placement of Watchable Wildlife trails and sites needs to carefully consider the tradeoffs of getting people close to certain wildlife species to be able to appreciate them and degrading their habitat or otherwise disturbing them.

Response: Reclamation will work with the Washington State Department of Fish and Wildlife to site Watchable Wildlife areas in the least intrusive locations.

The RMP should allow for adaptive management. As new information becomes available from other research, monitoring, etc., management strategies and policies should accommodate this. For example, seasonal closures are used for several actions for the three alternatives and these dates may need to be refined in the future as research continues or as monitoring shows that impacts are occurring outside of the restricted window.

Response: The Resource Management Plan will be structured to allow for adaptive management.

5.11 PUBLIC REVIEW AND COMMENT ON THE DRAFT FEIS

On January 26, 2001, the Potholes Draft Environmental Impact Statement (Potholes DEIS) was released for public review. Due to the public's heavy response pertaining to proposed closure of existing portions of the Off Road Vehicle (ORV) Area, the comment period was extended to April 28, 2001. During this time a public hearing and several Ad Hoc and concerned group meetings were held. In April, two public protests and one support rally regarding the closure of the Yellow Zone occurred at the Bureau of Reclamation (Reclamation) office in Ephrata, Washington.

Reclamation conducted a Potholes DEIS public hearing on March 13, 2001, at the Midway Learning Center in Moses Lake, Washington, to hear and record the public's comments. The hearing consisted of two sessions (from 3:00 p.m. to 5:00 p.m. and from 7:00 p.m. to 9:00 p.m.) and was fully documented by a court reporter. Approximately 150 people attended the sessions. Of those, 29 individuals made statements for the public record. The comments ranged from concern over mosquito and noxious weed problems to personal watercraft control in the study area. Most comments reflected concern about the proposed limitations of ORV use in the Yellow Zone. Copies of the recorded comments may be obtained from the Reclamation office in Ephrata, Washington.

Reclamation conducted an agency meeting, on May 7, 2001, attended by representatives of the U.S. Fish and Wildlife Service (FWS), the Washington Department of Fish and Wildlife (WDFW), and the Grant County Sheriff's Office. The purpose of the meeting was for the administering agencies to consider modifying proposed acreage reduction of the ORV Yellow Zone, based on the comments received at the public hearing. Individuals from Grant County discussed personnel limitations and budget constraints of the agencies to adequately manage

present jurisdictions. WDFW and Reclamation expressed the need to balance habitat preservation with public demand for recreation use within the study area. After the suggestion of various management options, Reclamation informed the group they would present the findings to Reclamation's regional manager.

The participating agencies met again, on June 4, 2001, to discuss a modified Preferred Alternative for the ORV Yellow Zone. Agreement from the user groups, agencies, and jurisdictional entities modified the Preferred Alternative to say, "Close 919 acres of the 1,459 acre Lower Crab Creek Arm Management Area (Yellow Zone) to motor vehicle travel and ORV use year-round. Maintain as seasonally open (July 1 to October 1) 540 acres of the 1,459 acre Yellow Zone."

The vegetation components in the seasonally open portion of the 1,459 acre Yellow Zone as compared to the permanently closed portion are:

Exposed and/or seasonally covered with water - 276 acres open; 479 closed
Grassland - 26 acres open; 48 acres closed
Riparian Forest - 3 acres open; 28 acres closed
Riparian Shrub - 187 acres open; 155 closed
Shrub Grass - 6 acres open; 32 acres closed
Shrubland - 18 acres open; 102 acres closed
Emergent Wetlands - 22 acres open; 75 acres closed

These changes do not constitute a substantive change in the impacts of the Preferred Alternative, which still provides for a balance of resource management and recreation use at Potholes Reservoir.

Public and Agency Comment Letters

112 individual letters, commenting on the DEIS, were received. In addition, 5 form letters were submitted. A single copy of each form letter and Reclamation's response is included in this section. Attachment A lists the names of people who signed each form letter.

The comment letters are presented in the order shown in Table J-1. All comment letters are presented and then are followed by all the responses. To aid the reader, the first page of the letter and the first page of the response to the letter are identified in TablThe public review of this FEIS will provide an opportunity for the public, agencies, and Tribes to submit written and oral comments to Reclamation. The comments received during the 60-day FEIS review

period, coupled with the testimony received during the public hearing held in Moses Lake, has be an important factor in the final decision concerning the preferred altemative and mitigation package used to prepare a detailed RMP for Potholes Reservoir.

As outlined on the following pages, copies of this FEIS were sent to the addresses identified in our public mailing list (see FEIS Distribution List), as well as to members of the Land Management Agency and Ad Hoc Agency work groups (see the Potholes Reservoir Land Management Agency and Potholes Reservoir Ad Hoc Agency work groups lists which follow).

CHAPTER 6
LIST OF PREPARERS

This is the list of individuals who prepared the FEIS.

PREPARERS

Name	Qualifications	Activity
Jonathan Beck	M.S. Biology B.S. Wildlife and Fisheries Assistant Biologist URS Corp. - 5 years Biological Resources Management - 8 years	Biological Resources Coordinator
Valerie Geertson	B.S. Botany Botanist URS Corp. - 4 years Biological Resource Management - 8 years	Vegetation, Botany
Steve Jakubowics	M.E.M. Environmental Management B.A. Biology Senior Planner URS Corp. - 3 years Federal and Private Experience - 18 years	Project Coordinator Hydrology
Dautis Pearson	B.A. Biology Senior Planner/Office Manager URS Corp. - 2 years Land Management Planning USDA FS - 6 years NEPA/ESA Coordinator USDA FS - 6 years	Project Coordinator Socioeconomics
Tamara Shapiro	M.S. Landscape Architecture B.S. English Planner URS Corp. - 3 years	Visual Resources Land Use

PREPARERS

Name	Qualifications	Activity
Sandra Steele	B.B.A Marketing Business Manager URS Corp. - 12 years	Document Production
Chris Watson	M.S. Geology B.S. Geology GIS Analyst URS Corp. - 3 years Boise State University - 3 years	Soil/Water/Geology
Lisa Kuchera	B.S. Geographic Information Management Minor Geology Assistant Planner URS Corp. - 8 years Environmental Experience - 6 years	Hazardous Materials
Andrea Balla-Holden	B.S. Fisheries Fisheries Biologist URS Corp. - 2 year Independent Contractor - 5 years	Fish
Rob Nielsen	PhD. Fisheries M.S. Fisheries B.S. Fisheries and Wildlife Science Fisheries Biologist URS Corp. - 10 years Fisheries Biology - 10 years	Fish

PREPARERS

RECLAMATION

Name	Qualifications	Activity
Lola Sept	Bureau of Reclamation	Regional Office NEPA Guidance
Dave Kaumheimer	Bureau of Reclamation	Area Office NEPA Coordination
Jim Blanchard	Bureau of Reclamation	RMP Activity Manager
BJ Howerton	Bureau of Reclamation	Indian Trust Assets
Mark DeLeon	Bureau of Reclamation	Cultural Resources

CHAPTER 7
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APPENDIX A
FINAL GOALS AND OBJECTIVES FOR POTHOLES RESERVOIR RESOURCE MANAGEMENT PLAN

February 20, 1997

INTRODUCTION

The goals and objectives for the future management of Potholes Reservoir have been developed in consultation with the public, interest groups, interested organizations, government agencies, and interested tribes. This document was prepared to provide guidance for developing alternative resource management scenarios for an Environmental Assessment, and to constrain the resulting Resource Management Plan (RMP) to include only those reasonable management actions which would contribute to achieving these goals and objectives.

Purpose of Potholes Reservoir

The primary purpose of Potholes Reservoir is to receive and store irrigation return, flood and public surface waters and to provide irrigation water supply to the East Columbia Basin irrigation District and the South Columbia Basin Irrigation District via the Potholes Canal. The United States, acting through the Secretary of Interior and the irrigation districts will operate the Potholes Reservoir to fulfill primary purpose obligations in an efficient manner.

The Potholes Reservoir will be operated in a safe and effective manner with the primary purpose of serving as an integral component of the Columbia Basin Project, receiving and storing irrigation return water in the reservoir, and providing irrigation water to the South and East Columbia Basin Irrigation Districts via the Potholes Canal.

The U.S. Bureau of Reclamation (Reclamation) will meet the contractual irrigation commitments related to operation of the Potholes Reservoir. The Potholes Reservoir provides the primary water source for the South Columbia Basin Irrigation District, and also provides water to the East Columbia Basin Irrigation District. Commitments to collect return waters from the East and Quincy Districts will also be met. The reservoir will be operated within established constraints on water surface elevation necessary to meet irrigation commitments, and assure public safety and protection of property. The Reclamation will meet other resource needs as feasible within the constraints of these objectives.

OVERALL GOALS AND OBJECTIVES

Goal

Develop integrated management policies designed to ensure that use of the Potholes Reservoir RMP Area maintains, protects and enhances natural, cultural, visual and recreational resources at Potholes Reservoir.

Objectives

- Establish written memoranda of understanding with the State of Washington related to management of the resources, as well as commercial and recreational activities at Potholes Reservoir.

- Establish a letter of understanding with Grant County relating to the management of visitor use at Potholes Reservoir.

- Manage resources within their respective regional contexts, i.e., the RMP area needs to be viewed as providing a component of the recreational resources of a larger region, a component of the home range of certain wildlife species, etc.

Goal

Develop a plan to obtain the data necessary to understand the status of the resources of Potholes Reservoir, and the factors affecting these resources, and to monitor the status of those resources and their uses in the future.

- Obtain and interpret management data

SPECIFIC GOALS AND OBJECTIVES:

Note that the following goals and objectives cannot be achieved solely by the Reclamation. For example, management of fish and wildlife in the Potholes RMP Area is the responsibility of the Washington Department of Fish and Wildlife. Likewise, the Washington Parks and Recreation Commission manages the Potholes State Park. Grant County, acting through the Sheriff's Department manages an Off Road Vehicle Area and enforces various laws within the RMP Area. Achieving these goals will require

cooperation among the Reclamation, the State of Washington (Parks and Recreation Commission, and Department of Fish and Wildlife) and Grant County. Consequently, each of these agencies have contributed to formulating these goals and objectives.

SOILS AND GEOLOGY

Goal

Maintain stability of the shoreline and subsurface areas of the reservoir.

Objectives

- Stabilize the active erosional areas along the east and north shores.
- Prevent erosion of State Park lands that can occur at high pool elevation in the day use area and the primitive camping area.
- Reduce sediment deposition in the vicinity of the State Park boat ramp.

VEGETATION

Goal

Maintain the "traditional" vegetation of the Potholes area, characterized by a native shrub-steppe plant community and a sand dune environment, along with wetland and riparian habitats in a unique geologic "potholes" setting.

Objective

- Develop management policies for protection of wetland, riparian, shrub-steppe and sand dune areas, which may include restrictions on use of some areas.

Goal

Control or eradicate noxious weeds, especially purple loosestrife, but including diffuse knapweed, spotted knapweed, Russian knapweed, perennial pepperweed, Kochia, Puncturevine, Canada Thistle, and saltcedar.

Objectives

- Comply with existing agreements and develop other necessary methods to reduce the continued spread of these weeds.

- Develop, implement and encourage active management activities to eliminate or reduce the presence of these weeds at Potholes Reservoir.

Goal

Manage other vegetation species of concern including Eurasian water milfoil, common reedgrass, and Russian olive, cheatgrass.

Objectives

- Assess the extent to which Eurasian water milfoil has become established in the reservoir and the need for and desirability of control practices.

- Assess the impact of the increased presence of dense monoculture stands of common reedgrass on wildlife habitat in the created wetlands areas in the project area, and develop management approaches as necessary.

- Evaluate the biological, social and economic cost of allowing the uncontrolled spread of Russian olive.

- Develop and implement methods to reduce the continued spread of these four plant species.

Goal

Maintain, protect and enhance plant communities which are important as a component of wildlife habitat [see WILDLIFE section].

WILDLIFE

Goal

Maintain, protect and enhance the species diversity of the wildlife populations within the Potholes Reservoir RMP area.

Objectives

- Inventory and map the distribution and abundance of wildlife populations utilizing the Potholes RMP area.
- Establish species management strategies and priorities for species groups of importance including waterfowl, upland gamebirds, colonial nesting birds, neotropical migratory birds, mule deer, and beaver.
- Maintain, protect and enhance populations and habitats of endangered, threatened, candidate and sensitive species of the Potholes RMP area.
- Implement species or population management necessary to perpetuate wildlife diversity.
- Implement only those programs, activities and management actions which directly and primarily benefit wildlife and wildlife-related recreation.
- Monitor wildlife species and populations for effectiveness of prescribed management.

Goal

Maintain, protect and enhance wildlife habitats.

Objectives

- Inventory, evaluate and map habitat components present in the Potholes RMP area.
- Identify geologic features, hydrology, vegetation and other conditions necessary for wildlife species and habitats.
- Establish habitat management priorities and strategies for important wildlife habitats, e.g., open water, wetlands, riparian areas, and shrub-steppe habitats.
- Monitor to determine success or failure of management strategies.

FISHERIES

Goal

Maintain and enhance fish habitat diversity.

Objectives

- Protect and manage fish habitat inclusive of spawning habitat, nursery areas, foraging areas, areas with vegetative cover, areas with physical structures that provide cover and food production throughout the reservoir.

Goal

Maintain species diversity within the following priority species:

Objectives

- Emphasize warmwater species complexes.
- Panfish (bluegill, black crappie, yellow perch) are the priority species managed for recreational purposes.

- Predator species (largemouth bass, smallmouth bass, walleye) are managed to provide improved panfish populations.

- Salmonid (trout family) species may be provided as additional sources of recreation.

Goal

Maintain and enhance the recreational fishing activity at the Potholes Reservoir as an important economic and recreation resource component.

Objectives

- Maintain and enhance a family-oriented recreational fishery that provides an opportunity for children to have a successful fishing experience, e.g., with panfish such as yellow perch, black crappie, and bluegill.

- Maintain and enhance sport fishing activity for important gamefish such as largemouth bass and walleye by providing an opportunity for a successful fishing experience for these species.

Goal

Base species management strategies on attainable study objectives as follows:

Objectives

- Determine current relative abundance of fish species.

- Determine, age, growth and condition of managed species.

- Inventory habitats, spatially and temporally.

- Determine the relationship between each species at each life history stage and existing habitats in the reservoir.

- Determine limiting factors for fish populations in Potholes Reservoir.

- Determine the effects of fish eating birds on fish populations.

- Determine the effects of angling pressure on fish populations.

Goal

Based on study results, develop and implement effective management strategies. Potential strategies could include, but are not limited to the following:

STRATEGIES

Regulation

- Establish appropriate fishing size and/or catch limits and seasons for species pursued by anglers on the Potholes Reservoir.

Supplementation

- Determine need for supplementary stocking of fingerlings, catchable size fish, or brood stock.

- Manage the potential introductions of fish species into the Potholes Reservoir to prevent undesirable effects of disease, increased competition, or increased predation in the Reservoir; and to prevent inadvertent introductions and adverse effects in the Columbia National Wildlife Refuge, Crab Creek, and the Columbia River drainage.

Habitat

- Protect and maintain desirable habitat features for fish throughout the year.

- Add desirable habitat features.

Tournaments

- Manage bass and walleye tournaments on the reservoir to ensure protection of the fish caught and released, and to avoid conflicts with casual recreational fishing activities.

Underutilized fisheries

- Promote utilization of lake whitefish.
- Establish carp fishing and archery regulations and/or incentives to increase carp harvest in Potholes Reservoir.
- Encourage commercial harvest of carp.

Species abundance

- Use rotenone to control carp in limited areas of the reservoir.
- Develop feasible management approaches if necessary to control bird predation on Potholes Reservoir fishes.

Goal

Monitor harvest to determine success of management strategies.

Objectives

- Monitor harvest at regular intervals through creel surveys.
- Maintain fishing contest records.
- Encourage participation in the Volunteer Angler Diary program.
- Monitor fishing guide participation.

WATER QUALITY

Goal

Maintain, protect and enhance water quality in the Potholes Reservoir RMP area to assure compatibility with irrigation needs, swimming, aesthetic appeal, fish production and consumption.

Objectives

- Identify any water quality driven constraints on Potholes Reservoir uses.
- Continue to maintain a baseline for reservoir water quality data at existing inlet and outlet sampling stations for routine water quality parameters (pH, alkalinity, nitrates, phosphates, etc.).
- Develop a water quality and sediment quality sampling program within the body of the Reservoir.
- Determine concentrations of potential contaminants of concern (dieldrin, methoxychlor, etc.) in the waters and sediments of the Potholes Reservoir RMP area.
- Determine sanitation-related water quality parameters (bacterial counts, BOD, etc.) for waters of the Potholes Reservoir RMP area.
- Compare water quality data to standards.
- Publish and distribute minimal sanitation standards for use of areas of the Potholes Reservoir.
- Provide routine testing of fish flesh for concentrations of organic pesticides, metabolic byproducts and heavy metals to assure the fishing population of the safety of these fish as a part of their food supply.

RECREATION

Goal

Maintain the current character of recreation at Potholes Reservoir RMP area by providing a diverse range of quality recreational opportunities within the carrying capacity of the natural resources.

Objectives

- Retain the current diversity of recreational activities as listed below:
  - Hunting
    duck and goose hunting
    upland gamebird hunting
    carp bow hunting
  - Fishing
    recreational
    competitive tournaments (with management controls)
    guided sport fishing
    commercial carp fishing
  - Boating
    recreational, non competitive
  - Personal watercraft
    recreational, non competitive
  - Off Road Vehicle (ORV) activities
    recreational (with management controls)
  - Water skiing
  - Camping
    recreational in developed campsites, not long term
    recreational dispersed in certain undeveloped areas, not long term
  - Picnicking
  - Bird Watching
  - Hiking
  - Parasailing
    - recreational, non-commercial
  - Diving
    - recreational, non-commercial
  - Swimming
  - Sunbathing

- Manage the number of visitors within limits of acceptable use.

- Retain the current predominance of recreational uses to the extent feasible, so that major uses continue to be major uses which are not limited by expansion of new or minor uses.

- Base recreational uses on natural resources.

- Retain the quality of the recreational experience.

- Provide recreational opportunities while ensuring maximum protection of natural resources.

- Identify, designate and manage specific areas for dispersed recreational use. Monitor impacts at these areas and modify use and management approach if impacts become unacceptable.

- Evaluate resource impacts of existing ORV use on Reclamation lands to assure that continued use is consistent with Reclamation policy.

- Evaluate potential for ORV use of Reclamation lands adjacent to existing ORV area, consistent with Reclamation policy.

- Evaluate a specific proposal advanced by Grant County ORV clubs for modification of areas allowed for seasonal ORV use and associated development.

- Generally, develop new facilities in close proximity to existing facilities, except for those facilities that may be needed to reduce impacts to areas of dispersed use.

Goal

Provide appropriate support services, facilities and regulations to enhance the quality and safety of recreation at Potholes Reservoir and fulfill unmet needs.

Objectives

- Consider expanding state park land and construction of additional camping areas to relieve pressure on undeveloped areas dependent on results of a needs analysis.

- Determine areas where lack of refuse containers and sanitation facilities are areas of concern and are impacting visual aesthetics, human health, and wildlife health and habitat.

- Seek or develop funding sources to increase sanitary facilities and refuse containers in the sand island areas, open water areas and other dispersed use areas thereby reducing the potential for impact on water quality and human health.

- Encourage volunteer cleanup projects by user groups in high use areas such as those projects that take place in the ORV area.

- Increase monitoring and enforcement of litter laws.

- Provide designated public swimming areas at the Potholes Reservoir away from the boat docks where swimming presently occurs. Assess use of the O'Sullivan Site area which has been suggested for a designated swimming area.

- Consider a near shore buffer/no-wake zone in Potholes Reservoir to mitigate conflict among fishermen, recreational boaters, personal watercraft users, swimmers and water-skiers who all desire use of near shore areas for their activities. The no-wake zones may also reduce shoreline erosion caused by wave action, reduce impacts to fish nests and spawning habitat, and reduce wildlife impacts such as unintentional flooding of bird nests.

- Devise a management strategy in conjunction with Grant County for the significant number of individuals camping in the existing Off Road Vehicle (ORV) area at the northeast part of the reservoir. The strategy needs to deal with the availability of sanitation facilities, refuse containers and control of ORV access into environmentally sensitive areas.

- Coordinate ORV management strategy with the Department of fish and Wildlife to provide a mechanism to assure protection of wildlife and habitat in the designated "Red Zone" and "Yellow Zone".

- Develop management strategies to mitigate the environmental effects of significant random camping in the sand island areas, as well as at O'Sullivan Site and the Job Corps Dike area.

- Establish a pack-in/pack-out regulation for use of dispersed use areas.

- Designate and maintain multi-use trails to minimize resource damage.

- Identify and restrict public access to areas that present safety concerns

- Identify and develop appropriate use restrictions for recreational and other activities that may include limitations on portions of the Potholes RMP area where the activity is allowed, season when the activity is allowed, time of day when the activity is allowed, etc. Such restrictions shall be developed only as necessary to protect or enhance the environment, fish and wildlife habitat, human health and safety, or the quality of the recreational experience.

- Consider potential restrictions on full power boat and personal watercraft operation in the near vicinity of O'Sullivan Dam to help prevent serious accidents due to collision with submerged rocks.

- Review Project authority, liability and insurance considerations associated with providing a designated swimming area, and allowing sponsored recreational events such as tournaments, races, etc., to limit the potential liability of Reclamation, Irrigation Districts, the State of Washington, or Grant County.

Goal

Provide an appropriate range of information materials to increase public awareness of recreational opportunities, use restrictions, safety concerns, and natural and cultural resource values.

Objectives

- Educate the public on the presence of submerged boating hazards due to reduced water levels. As a general policy, such hazards are not marked in non-navigable (by definition) waters.

- Educate the public on pack-in/pack-out ethic or regulations, fishing regulations, hunting regulations, boating regulations, camping regulations.

CULTURAL RESOURCES

Goal

Preserve, protect, maintain and enhance cultural resources including archaeological sites, ethnographic sites and traditional use areas within the Potholes Reservoir RMP area.

Objectives

- Locate, identify and describe cultural resource sites in the Potholes Reservoir RMP area.
- Restrict visitor use of these sites with appropriate management techniques.
- Determine eligibility of resources for National Register listing.
- Preserve geological formations and historic sites for the education and enjoyment of the public.
- Enhance cultural resources through appropriate educational programs or other management activities.
- Pursue Memoranda of Understanding with concerned or interested Tribal governments related to this goal, and achieving other RMP goals and objectives.

VISUAL RESOURCES

Goal

Preserve, protect, and enhance the natural scenic resources of the Potholes Reservoir RMP area.

Objectives

- Minimize development in areas that would adversely affect natural scenic resources.
- Develop design guidelines for land development within the Potholes RMP area.
- Design facilities to minimize adverse effects on visual quality.

- Include provisions in leases which require that form, line, texture, and building materials used must be compatible with the natural landscape.

- Close and re-vegetate (using native plants) any roads or trails that are not planned for future use.

LAND USES

Goal

Assure that adjacent land uses are compatible with the desired recreational and wildlife uses in the Potholes Reservoir RMP area.

Objectives

- Propose future development in a way which minimizes the potential interference with the function of existing and planned land uses.

- Manage lands to protect water resources.

- Land use decisions on Wildlife Areas will be based on benefits to wildlife and habitat.

Goal

Coordinate land use plans with Grant County to address ORV use.

Objective

- Review Reclamation policy as well as the impact on the environment to determine if additional land will be permitted or if presently-permitted land will be removed from use.

Goal

Coordinate with Grant County on implementation of its sensitive areas ordnance on lands adjacent to the Potholes RMP area.

ACCESS

Goal

Evaluate, enhance and manage vehicle, boater and pedestrian access to the Potholes Reservoir with regard to recreation, protection of cultural resources, wildlife management and operational needs in accordance with Americans with Disabilities Act (ADA) guidelines.

Objectives

- Enter into negotiations with the state highway department to address engineering of measures to alleviate congestion along State Route 262 that occurs during high-use periods due to lack of engineered safety features, such as walkways and overpasses.

- Provide adequate boat launch access and availability at all water levels. Identify potential new access sites and improvements needed at existing launch sites.

- Provide effective reservoir bank and boat launch access for the disabled by developing and implementing design guidelines in conformance with ADA guidelines for access areas.

MANAGEMENT AND INFRASTRUCTURE

Goal

Develop the framework of eventual agreements between the Reclamation, the State of Washington and Grant County to provide for effective future management of resources at the Potholes Reservoir.

Objectives

- Clearly delineate agency responsibilities and land management responsibility designations inherent in the management of resources in the Potholes Reservoir RMP area.

- Identify and enumerate the constraints of staff availability, equipment shortages, and funding on management and enforcement responsibilities shared by the Grant County Sheriff, the Washington Parks and Recreation Commission and the Washington Department of Fish and Wildlife.

- Mitigate these constraints where possible.

- Discuss establishing guidelines for development and growth of activities on DNR-leased lands not currently managed in conjunction with other land use activities.

- Investigate fee-for-use as a potential source of funds for maintenance and improvement of recreational facilities, for waste disposal services and/or to pay for management and enforcement activities.

- Examine and determine the applicability of Reclamation and Washington state policies that address commercial recreational activities. [Determine if these activities e.g., fishing guides, watercraft rentals, horseback rentals, concessions, etc., exist or have been proposed and may compete with or impact noncommercial recreational activities. Examine policies to determine if change is needed or to establish franchising or use fees.]

- Develop agreements with DNR, County Fire Districts and others to provide protection and suppression services for wildfires.

APPENDIX B
GENERAL MANAGEMENT STRATEGIES ASSOCIATED WITH THE RMP

Four general management strategies were developed and applied to each of the RMP alterative (B, C, and D) for (1) no motorized access, (2) managed/limited motorized access, (3) recreation sites and improvements, and (4) resource protection and enhancement. Each of these strategies involve the following:

No Motorized Access:

- Roads and/or areas (land or water) where motorized access (i.e., motorboats, personal watercraft, and/or motor vehicles) would be prohibited due to natural and/or cultural resource protection/enhancement objectives, land use compatibility/suitability conflicts, soils/slope unsuitability, and /or public safety concerns. Motorized access for administrative or emergency purposes may be permitted.

- Fencing, gates, signs, buoys, or other access control features may be installed.

- Non-motorized recreational activities and access may be permitted if other management objectives are not compromised.

- Permanent closure and restoration/rehabilitation actions would be initiated in severely damaged areas.

Managed/Limited Motorized Access:

- Roads and/or areas (land or water) where seasonal or year-round motorized access would be permitted.

- Where motorized road access is desirable, road access routes would be designated "open" to motorized travel. Primary/secondary roads kept open for public access would be asphalt or gravel surfaces (except within the Grant County ORV Park). Formal and informal parking/staging areas would be provided as needed to accommodate access for boating, hunting, fishing, horseback riding, wildlife viewing, or other recreation pursuits. On primitive (dirt) roads where substantial gulling, rutting, or environmental damage has occurred but continued vehicle access is desirable, selective temporary road/trail closures and/or minor road improvements would occur.

- Areas where motorized watercraft access would be limited to low speed/minimum wake operation to minimized wildlife disturbance, shoreline erosion, or other resource effects. "Minimum Wake" means a very slow speed producing almost no wake (Grant County Boating Ordinance 6.08.030(17), June 1999.

Recreation Sites and Improvements:

- Emphasis is on focusing and directing recreation to specific areas environmentally suited for public use. Recreation would be limited or discouraged in areas with environmental sensitivities, specific resource constraints, or conflict with adjacent land uses and /or private property. Motor vehicle access may be provided, or sites ma be designated for boat-in/walk-in or non-motorized access only.

- Facility improvement at any given site would be determined based on current and desired use, and anticipated needs, compatibility with surrounding use, recreational opportunities present, site carrying capacity, and avoidance of significant environmental impact.

- Discourage Control Use Areas - Areas where public use would be discouraged or controlled due to the presence of sensitive cultural or natural resources. These areas would not be identified in visitor brochures or on re-creation signs/map displays installed at Potholes Reservoir. Optional localized signs could be installed to inform the public of why a seasonal closure or other restriction is desirable.

- Dispersed Camping Areas - Areas specifically designated and managed for dispersed camping would be identified as such in visitor brochures and on recreation signs/map displays installed at Potholes Reservoir. No campsite improvements would be developed and sanitation facilities (i.e., seasonal portable toilets or permanent vault toilets) would be provided where human waste pose a public health concern. Trash would generally be managed under a pack-in/pack-out policy.

- Primitive Camping Areas - Areas specifically designated and managed for primitive camping would be identified as such in visitor brochures and on recreation signs/map displays at Potholes Reservoir. Limited facility improvements (i.e. fire rings/grills) would be installed to delineate individual campsites and sanitation facilities (i.e., seasonal portable toilets or permanent vault toilets) provided where human wastes pose a public health concern. Trash would generally be managed under a pack-in/pack-out policy.

- Developed Recreation Areas - Facilities would be provided for user comfort and convenience (i.e., restrooms, potable water, utility hookups, shade trees, etc). Facility design would be more complex and refined, and moderate to heavy site modification would be required for construction. Individual campsites would generally feature picnic tables, fire rings, pedestal grills, tent pads, and vehicle parking. Centralized trash collection may be provided.

Resource Protection and Enhancement

- Land areas where active attention to resource protection is needed or desired. Road closures, dispersed camping restrictions, fencing to restrict vehicular or livestock access, or other actions may be used to curtail existing or impending causes of damage to soil, water, vegetation, wildlife, scenic or cultural resources.

  In general, this type of resource management aims to protect/conserve existing resource values or restrict/control use so that resources can recover from previous damage or overuse.

- Habitat Management Areas (HMAs) - The HMAs would include wetland/riparian and shrub-steppe habitat areas that provide high quality nesting and foraging areas for WDFW priority species (i.e., grebes, leopard frogs, egrets, white pelicans, bald eagles, and beaver). Specific habitat conservation and enhancement programs would be developed by the WDFW in conjunction with the USFWS for each HMA. All areas would be more intensively managed than in the past to enhance habitat conditions for shorebirds, waterfowl, mule deer, and other non-game and game species.

- Public use would be permitted but not encouraged in HMAs. The discharge of firearms would be prohibited from March 1 until the start of the hunting season as established by the WDFW each year. With the possible exception of selected interpretive hiking trails, no new roads or trails would be developed and motorized access would be limited to existing roads and seasonally/permanently restricted where needed to reduce human disturbance during critical wildlife reproductive periods.

- Where feasible and appropriate, HMAs would be fenced and signed and habitat improvement measures implemented. Programs for riparian/wetlands habitat enhancement, habitat improvements measures (i.e., perch trees for bald eagles,

nesting platforms, duck nesting ponds, etc.), erosion and weed control, and dike maintenance/enhancement to manage as carp-free waters would be implemented.

- The use of pesticides and herbicides harmful to fish and/or wildlife would not be allowed. In concert with WDFW's goal to avoid or minimize the use of chemical controls, mosquito control efforts will emphasize BTI or similar biological means.

APPENDIX C
ENVIRONMENTAL COMMITMENTS

In addition to the management actions described as part of the alternatives, the following mitigation actions are considered to be commitments being made by the Bureau of Reclamation.

Air

- The Reclamation would require air quality control measures in construction specifications for any proposed development actions under all the alternatives.

Soils

- During construction planting grasses, forbs, trees and shrubs or placement of riprap, sand bags, jute, sod, erosion mats, bale dikes, mulch, or excelsior blankets would decrease erosion.
- Clearing schedules would be arranged to minimize the practical exposure of soils.
- Final erosion control and site restoration measures would be initiated as soon as an area is no longer needed for construction, stockpiling, or access.
- Short-term effects such as increased land or shoreline erosion in or near recreation sites would be minimized by adhering to Best Management Practices (BMPs) during construction.

Water Quality

- Expand the reservoir water quality and sediment sampling program. Review the need for routine testing of fish flesh for concentrations of contaminates for pesticides and heavy metals, and minimize chemical mosquito control methods.

Vegetation

- The use of native species or non-invasive species is recommended for revegetation efforts to maximize the potential to restore revegetated areas to high quality habitat
- Construction specifications would require contractors to preserve the natural landscape and prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the work vicinity.

- Critical environmental areas (i.e., stream corridors, wetlands, riparian areas, Ute ladies'-tresses orchid and gray cryptantha habitat, and steep slopes) would not be used for construction equipment or material storage or stockpiling; construction staging or maintenance; or temporary access roads.
- Upon the completion of construction, any land disturbed but not permanently occupied by new facilities would be graded to provide proper drainage and blend with the natural contours of the land, covered with topsoil stripped from construction areas, and revegetated with plants native to the area and beneficial to wildlife.
- The final recommended composition of plant species, seeding rates, and planting dates would be determined in consultation with the WDFW and USFWS (where applicable or appropriate). .
- Uplands would be revegetated to the native vegetative community appropriate for the site's soil type, topographic position, and elevation.

Wildlife

- Efforts will be made to attempt to restore native plant "communities".
- More aggressive weed control plans, above and beyond simply noxious weed control measures, should benefit native plant communities.
- The development of new campgrounds, boat launches, interpretive trails, etc. should take place in areas which minimize adverse impacts to fish and wildlife.
- Special signage, seasonal road closures, firearms or shooting restrictions, and some vegetation management are measures which may improve conditions for Washington ground squirrels near Lind Coulee
- Bald eagles roosts and regular perch sites could be protected with access restrictions.
- Interpretive information could be developed to educate the public on the valuable and unique habitats and associated unique species present and measures being employed to protect them.

Fish

- Prior to any construction or bank stabilization projects, site-specific erosion and sediment control measures would be identified and incorporated into the project's construction specifications, reducing sediment delivery to the reservoir.

- Construction sites would be revegetated and riparian areas near shorelines would be planted with trees and shrubs to provide shade and habitat for fish and near-shore wildlife.

- Projects built below the reservoir high water line would be timed for construction to occur when the reservoir pool is at its lowest elevation to avoid damage to fish spawning and rearing habitat caused by the release of sediment into the reservoir or increases in turbidity.
- Short-term effects such as increased shoreline erosion in or near construction sites would be minimized by adhering to Best Management Practices (BMPs) during project construction.
- During final layout and site design, measures to minimize asphalt surface runoff and the potential for pollutants (e.g., oil) entering the reservoir would also be identified and incorporated into the design.
- Herbicides used for the control of Eurasian water milfoil and purple loosestrife would be selected for their low toxicity to aquatic wildlife and fish.

TES Species

- In consultation with the USFWS, mitigation measures would be developed to minimize adverse impacts where appropriate, to special status species and habitats regardless of the alternative selected.

Cultural

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- All identified cultural resources are recorded and mapped to professional standards.
- Whenever possible, cultural resources will be avoided during project implementation.
- Conduct Class III surveys and prepare a Cultural Resource Management Plan (CRMP).
- Coordinate with Native Americans with interests at Potholes Reservoir to prepare the CRMP and manage cultural resources.

Monitoring

Mitigation actions for some adverse impacts could include restoration of native vegetation in various portions of the project area. Restoration efforts under mitigation should be tied to monitoring and success criteria. That is, if initial restoration actions fall short of goals, additional actions would be necessary. Monitoring plans will be incorporated into the mitigation measure to look at effectiveness of the measure and adaptive management to pursue.