

Greetings and welcome to the **January-February 2013** edition of the Climate News Digest. The purpose of this digest is to provide highlights of relevant climate change news, events and resources for WDFW staff. Feedback or suggestions for items to include in future editions are much appreciated – many *thanks* to those who have sent links and references and please keep them coming. Previous editions of the newsletter are now stored on the Habitat Program Sharepoint site -- <http://sharepoint.dis.wa.gov/dfw/habitat/climatechange/default.aspx>.

Note: Several references to articles and events are drawn from a USFWS climate change newsletter, assembled and shared by David Patte. If you are interested in signing up directly for this newsletter, please email David [david_patte@fws.gov].

WHAT'S HAPPENING AT WDFW?

Selected projects, agency resources and initiatives

Richard Tveten is preparing a **statewide forest management plan for WDFW Wildlife Management Areas**. This plan will identify forest management needs and priorities relating to ecological integrity, priority species and risk management. He is exploring how to address include vulnerability to climate change in prioritizing forests for treatment and how recommendations to address climate change align with actions needed to address other concerns. In general, recommendations for addressing climate change appear to reinforce actions already identified as necessary to address immediate problems related to poor forest health, degraded habitat quality, and elevated wildfire risks. For more information contact Richard.

Several WDFW staff recently participated in a workshop to explore a **framework for integrating climate considerations into restoration projects**, specifically for oak prairie systems. The workshop included a presentation on climate impacts to these systems and an introduction to the principles of climate-smart restoration. Participants also practiced applying a vulnerability assessment to a restoration project and using the findings to identify possible project modifications. For more information or copies of the materials provided, please contact Lynn.

CLIMATE ADAPTATION AT OTHER ORGANIZATIONS

[Department of the Interior's recently published Climate Change policy](#)

This policy provides guidance to bureaus and offices for addressing climate change impacts throughout the Department's mission, programs, operations, and personnel.

USFWS Proposes to List Wolverines as Threatened under the Endangered Species Act

One of the key factors for the proposal is extensive climate modeling that indicates the wolverine's snowpack habitat will be greatly reduced and fragmented in the coming years due to climate warming, thereby threatening the species with extinction. The proposed rule provides an extensive review of these climate change impacts. Wolverines are dependent on areas in high mountains, near the tree-line, where conditions are cold year-round and snow

cover persists well into the month of May. [Click here to read more and for a copy of the proposal.](#)

LEARNING OPPORTUNITIES

Feb 22 Workshop: [Willamette Water 2100 Learning Action Network Workshop](#), Salem. This project is evaluating how climate change, population growth, and economic growth will alter the availability and the use of water in the Willamette River Basin on a decadal to centennial timescale. The [National Science Foundation](#) funded project seeks to create a transferable method of predicting where climate change will create water scarcities and where those scarcities will exert the strongest impacts on human society. The [five year project](#) began in October 2010, and is a collaborative effort of faculty from Oregon State University, the University of Oregon and Portland State University.

March 12, Workshop on the Draft Third National Climate Assessment, Portland, OR, 8a.m.-4p.m. (Pacific Time). Participants will have the opportunity to: 1) Learn about the National Climate Assessment; 2) Learn from and talk with report authors, members of the National Climate Assessment and Development Advisory Committee, and National Climate Assessment staff about how the information provided in National Climate Assessment products is and can be used in various decision making contexts; 3) Share knowledge and information about local and regional efforts to study and respond to the impacts of climate change in the Northwest; and 4) Collaborate with other meeting participants to identify ways that you and your community can participate in the long-term National Climate Assessment process.

April 15-18: [2013 Western Division of the American Fisheries Society Annual Meeting](#) , Boise, ID features a climate-aquatics symposium organized by Dan Isaak and colleagues, **titled “New information regarding climate effects on aquatic resources: how do we use this information?”** A 1-day workshop on spatial statistical model for stream networks will be held in conjunction with the meeting. Jay Ver Hoef (NOAA) and Erin Peterson (CSIRO in Australia), who will conduct the workshop, have developed the statistical theory for these models over the last decade and have recently developed freeware statistical software for the R environment to make implementation of the models convenient. The spatial statistical models are applicable to a wide variety of data types commonly collected from streams (water quality parameters, habitat conditions, biological attributes), provide improved estimation relative to traditional statistical models, and even enable new types of analyses that were not previously possible for streams. Contact Dan Isaak for online participation if you cannot attend or for more info: disaak@fs.fed.us

RESOURCES

National Climate Assessment Draft Report Released

“Climate change, once considered an issue for a distant future, has moved firmly into the present,” according to this report. “Americans are noticing changes all around them. Summers

are longer and hotter, and periods of extreme heat last longer than any living American has ever experienced. Winters are generally shorter and warmer.” The U.S. Global Change Research Program (USGCRP) released the draft of the third National Climate Assessment (NCA) on January 11, 2013 for public review. This report fulfills the requirements of the Global Change Research Act of 1990, which states that a climate change assessment must be provided to the President and Congress every four years. A 60-person Federal Advisory Committee, the National Climate Assessment and Development Advisory Committee (NCADAC), has overseen the development of the draft report. Following extensive review by the National Academies of Sciences and by the public, this report will be revised by the NCADAC and, after additional review, will then be submitted to the Federal Government for consideration in the Third NCA Report. To download the draft report, visit: <http://ncadac.globalchange.gov/>. (SEE MARCH 12th, in Learning Opportunities for an opportunity to attend a town meeting and learn more about this report).

Ecosystem Adaptation to Climate Change in California: Nine Guiding Principles:

The Resources Legacy Fund (RLF) convened a panel of leading scientists to support diverse and well-functioning ecosystems even as environmental conditions shift, species move, and ecosystems transform. The panel recommends the following nine principles be followed:

- #1: Conserve the variety of ecological settings that will continue to support California’s biodiversity and ecosystems as they shift in response to the changing climate.
- #2: Conserve and restore landscape linkages and connectivity areas that will allow diverse species to move to new locations and will enhance overall species persistence.
- #3: Set priorities for watershed protection and management that will yield conservation and societal benefits as water flows become more variable and potentially decline.
- #4: Adjust flows below dams and protect coldwater habitats to support native species and aquatic ecosystems.
- #5: Develop and implement strategies that will enhance the persistence of coastal ecosystems as sea level rises.
- #6: Manage ecosystems for resilience in the face of extreme events.
- #7: Align adaptation and mitigation strategies to optimize the co-benefits for people and ecosystems.
- #8: Use best available scientific information and technical know-how to make informed decisions now and act adaptively as knowledge improves.
- #9: Manage for the future.

U.S. Forest Service Releases Report on Water Resources Vulnerabilities to Climate Change

The U.S. Forest Service recently released a report detailing innovative approaches to assessing the relative vulnerability of water resources to climate change on national forests. The report, "Assessing the Vulnerability of Watersheds to Climate Change: Results of National Forest Watershed Vulnerability Pilot Assessments" was sponsored by the U.S. Forest Service Stream Systems Technology Center. The report summarizes findings of a collaborative effort between land managers and researchers in which at least one national forest from each of the Forest Service's nine regions participated. Eleven National Forests from throughout the United States conducted assessments of potential hydrologic change due to ongoing and expected rapid

climate warming. Each National Forest identified water resources important in their area, assessed climate change exposure and watershed sensitivity, and evaluated the relative vulnerabilities of watersheds and water resources to climate change. The report provides an overview of core assessment components and highlights similarities and differences of the eleven pilot assessments. Important concepts that emerged during the pilot assessments are emphasized. To view the report online, visit: <http://www.fs.fed.us/ccrc/>.

CLIMATE SCIENCE NEWS

NOAA Announces State of the Climate Global Analysis for 2012 and Warmest Year on Record for Contiguous United States

The National Oceanic and Atmospheric Administration (NOAA) has released the State of the Climate Global Analysis for 2012. The analysis states that 2012 was the warmest and second most extreme year on record for the contiguous United States. It was a historic year for extreme weather that included drought, wildfires, hurricanes, and storms. The average temperature for 2012 was 55.3 degrees Fahrenheit (F), 3.2 degrees above the 20th century average, and 1.0 degree above 1998, the previous warmest year. The average precipitation total for the contiguous U.S. for 2012 was 26.57 inches, 2.57 inches below average, making it the 15th driest year on record for the nation. The year 2012 saw 11 disasters that reached the \$1 billion threshold in losses, to include Hurricanes Sandy and Isaac, and tornado outbreaks experienced in the Great Plains, Texas and Southeast/Ohio Valley. To view the analysis, visit: <http://www.ncdc.noaa.gov/sotc/>.

Coupling snowpack and groundwater dynamics to interpret historical streamflow trends in the western United States: “This study adds an important new dimension to the interpretation of streamflow trends. The results demonstrate that broad between-watershed (geologic) differences in drainage rates exert a first-order control on the magnitude of climate warming effects. In the western United States, underlying geologic controls lead to both fast shallow subsurface-dominated systems and slower deeper groundwater systems.... This study confirms for the first time that actual streamflow trends reflect these underlying geological controls on drainage efficiency. It shows that differences between “fast shallow subsurface” and “slow groundwater systems” are as important as differences between rain- and snow-dominated watersheds in evaluating streamflow response to climate change, although they are not directly affected by climate change itself....” Safeeq et al. 2013. Hydrol. Process. DOI: 10.1002/hyp.9628

Descriptors of natural thermal regimes in streams and their responsiveness to change in the Pacific Northwest of North America: Hydrologists have long used multiple descriptors to characterize annual flow regimes in streams. This study develops and evaluates multiple descriptors of the magnitude, variability, frequency, duration, and timing of annual thermal regimes in five streams in the PNW. The study examines the synchrony (temporal scale) and coherence (spatial scale) of these descriptors to distinguish responses to regional climate variability from local human or natural influences. Similar to trends in air temperature across

the region, the greatest warming is observed with winter-spring minimum daily stream temperatures, suggesting that this may be a responsive indicator of climate change. The study highlights the importance of year-round temperature monitoring and characterization. Arismendi et al. 2013. Freshwater Biology doi:10.1111/fwb.12094

SPECIES AND HABITATS

[Assessing climate change vulnerability of breeding birds in Arctic Alaska](#)

Climate change is occurring at an accelerated rate in the Arctic compared to most other places on the earth and these rapid changes in habitats, especially those associated with hydrology, are ultimately influencing wildlife populations. To help address these emerging needs the Wildlife Conservation Society conducted a climate change vulnerability assessment for arctic breeding birds to help guide climate-informed wildlife management in the region.

[The impact of global climate change on genetic diversity within populations and species](#)

Genetic diversity provides the basic substrate for evolution, yet few studies assess the impacts of global climate change (GCC) on intraspecific genetic variation. This review seeks to answer such questions as: Why study the effects of GCC on intraspecific genetic diversity? How does GCC affect genetic diversity? How is the effect of GCC on genetic diversity currently studied? Where is potential for future research? The authors further discuss how cryptic diversity can affect GCC assessments, how genetic diversity can be integrated into studies that aim to predict species' responses on GCC and how conservation efforts related to GCC can incorporate and profit from inclusion of genetic diversity assessments. Pauls et al., 2013, Molecular Ecology 22:925-946 (Feb. 2013)

Climate Change versus bark beetles and catastrophic wildfire

In a peer-reviewed paper published this week in [Natural Areas Journal](#), scientists say they found through a literature review that bark beetles do not substantially increase the risk of crown fire in lodgepole pine and spruce forests, as commonly assumed. Instead, they concluded, the fires are primarily caused by dry conditions exacerbated by climate change. And as long as severe droughts continue, so will wildfires, regardless of beetle populations. The paper's findings are similar to those reached by University of Wisconsin researchers in 2010. That research team used NASA satellite data to identify large swaths of beetle-killed forests near Yellowstone National Park. The team compared maps of recent fires with the maps of beetle-killed forests. They were surprised to learn large fires did not appear to occur more often or with greater severity in forest tracts with beetle damage. In fact, in some cases, beetle-killed forest swaths seemed less likely to burn because the fire stalled out in the dead trees that had lost their needles and branches. The common link between beetles and fire wasn't what they had assumed — beetle-killed trees stoking fire — but something else: climate change. Warmer, drier weather was fueling both drought and beetle populations. <http://www.bioone.org/doi/full/10.3375/043.033.0107>

Climate Change Projected to Alter Indiana Bat Maternity Range

Research by U.S. Forest Service scientists forecasts profound changes over the next 50 years in the summer range of the endangered Indiana bat. In an article published in the journal *Ecology and Evolution*, Forest Service Southern Research Station researchers Susan Loeb and Eric Winters discuss the findings of one of the first studies designed to forecast the responses of a temperate zone bat species to climate change. The researchers modeled the current maternity distribution of Indiana bats and then modeled future distributions based on four different climate change scenarios. “We found that due to projected changes in temperature, the most suitable summer range for Indiana bats would decline and become concentrated in the northeastern United States and the Appalachian Mountains,” says SRS research ecologist Loeb. “The western part of the range (Missouri, Iowa, Illinois, Kentucky, Indiana, and Ohio)—currently considered the heart of Indiana bat maternity range—would become unsuitable under most climates that we modeled. This has important implications for managers in the Northeast and the Appalachian Mountains as these areas will most likely serve as climatic refuges for these animals when other parts of the range become too warm.” Access the full text of the article: <http://onlinelibrary.wiley.com/doi/10.1002/ece3.440/abstract>

Climate vulnerability assessments may fall short for migratory bird species

Researchers reported in a recent article in the journal *Nature Climate Change* that conservation professionals are working hard to understand how climate change will influence species and to develop strategies to manage the risks, but migratory species pose a particular challenge. Migration is an adaptive response to geographic and seasonal variation in resources, but climate change may disrupt the longstanding, and sometimes impeccably timed, relationships between migratory species and their environment. Changes in ecological conditions may be taking place on both ends of a migratory route, making it difficult to predict how climate alterations will affect a species or affect it across its range. Current assessments fall short in predicting the vulnerability of migratory species to climate change, neglecting to look at the species’ migratory status or consider factors that impact the species outside of their breeding grounds. The authors note that although current efforts to assess species’ vulnerability to climate change are commendable, efforts must be taken to update the methods so that they better capture the full annual cycle for migratory species. “We fear that getting it wrong will have enormous costs—the foremost being missed opportunities to take conservation action at the right times and places for those species most likely to be vulnerable.” *Nature Climate Change*, 2013. DOI: [10.1038/nclimate1810](https://doi.org/10.1038/nclimate1810) ([About DOIs](#)).

[Wildlife in a Warming World](#), National Wildlife Federation, Jan. 29. This report summarizes the effects of climate change to wildlife with case studies from the continental U.S. and the Arctic. Key messages include: (1) Our nation’s plants, fish, and wildlife are already facing a climate crisis; (2) Now is the time to confront the causes of climate change; (3) Wildlife conservation requires preparing for and managing climate change; and (4) Only by confronting the climate crisis can we sustain our conservation legacy.

International Monetary Fund Chief: 'Unless We Take Action On Climate Change, Future Generations Will Be Roasted, Toasted, Fried And Grilled' (thinkprogress.org)

The IMF managing director Christine Lagarde is the former finance minister of France. At the World Economic Forum in Davos, she said, “the real wild card in the pack” of economic pivot points is “Increasing vulnerability from resource scarcity and climate change, with the potential for major social and economic disruption.” She called climate change “the greatest economic challenge of the 21st century.” Ms. Lagarde concluded with a call for a new kind of economic growth. “So we need growth, but we also need green growth that respects environmental sustainability. Good ecology is good economics. This is one reason why getting carbon pricing right and removing fossil fuel subsidies are so important.” In response to a question from the audience, she said: “Unless we take action on climate change, future generations will be roasted, toasted, fried and grilled.”

Cities Lead Over Feds on Climate Change Adaptation (SustainableBusiness.com)

Superstorm Sandy offered another reminder of how vulnerable communities around the world are - and will be - to the impacts of climate change. It makes sense then that cities are being more proactive than federal governments - in fact, two-thirds of cities around the world are actively planning for the impacts of global warming, says the International Council for Local Environmental Initiatives (ICLEI) and the Massachusetts Institute of Technology (MIT). Unfortunately, cities in the US lag on this, despite the fact that the weather was the most extreme ever in 2012, according to the National Oceanic and Atmospheric Administration (NOAA). The most active cities are in Africa, Australia, New Zealand and Canada, but ICLEI's analysis shows that planning is just getting started in general. 59% of US cities are developing climate adaptation strategies, just 13% have even completed a risk assessment of their vulnerabilities. Although cities outside the US are further ahead, with 68% in the planning stage, a modest 19% of them have gotten beyond the risk assessment stage. Read ICLEI's report, *Urban Climate Adaption Planning*: www.icleiusa.org/action-center/learn-from-others/local-governments-extreme-weather-and-climate-change-2012