

Greetings and welcome to the **April 2013** edition of the WDFW Climate News Digest. Our purpose 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. Note that previous editions of the newsletter are now stored on the Habitat Program Sharepoint site -- <http://sharepoint.dis.wa.gov/dfw/habitat/climatechange/default.aspx>.

WHAT'S HAPPENING AT WDFW?

Selected projects, agency resources and initiatives

Climate Change and the Chehalis

Tim Quinn (Habitat Program, Science Division) and others are working to integrate consideration of climate change into an RFP to assess ecosystem impacts from flood control activities on the Chehalis river. The Chehalis River Basin Flood Authority is evaluating the feasibility of reducing the frequency and severity of flooding on the Chehalis River by means of a flood control structure on the upper mainstem Chehalis River and the RFP for work to assess impacts was funded by the Washington State legislature. Specific interests for the RFP regarding climate change are to develop a better understanding regarding how a proposed flood control structure could either exacerbate or mitigate for climate change impacts to aquatic systems and species.

Washington Wildlife Area Management Plans

Lauri Vigue (Wildlife Program, Lands Division) is leading an effort within the Wildlife Program to revise management plans for State Wildlife Areas, and is working to address climate change in both overarching guidance and in templates for developing management plans for specific sites. The focus will be on identifying which site management objectives are sensitive to climate change, and how to accommodate expected changes. A steering committee is currently working on templates with pilot projects scheduled for summer.

CLIMATE ADAPTATION AT OTHER ORGANIZATIONS

Washington State Department of Transportation

WSDOT recently published a brochure about its climate adaptation program (attached), which profiles the agency's efforts to build a more resilient and sustainable transportation system in light of climate change. The brochure highlights the results of a 2011 study which examined the vulnerability of the state's transportation system to a changing climate, and describes progress to integrate the findings of the vulnerability assessment into existing asset management frameworks.

Washington State Department of Ecology

On June 10, 2012, from 10:00 am to 12:00 pm, Ecology will be hosting a seminar on climate change and ocean acidification. Dr. Amy Snover, Director of the Climate Impacts Group at the University of Washington, will present the science of ocean acidification in Washington State. Hedia Adelman (Ecology) will provide an overview of mitigation and adaptation activities in the state and Ecology's role in climate change and ocean acidification. Limited seating is available for attendees outside Ecology – please RSVP to Lynn if you plan to attend.

NOTE: WDFW is planning another workshop on Ocean Acidification here at the NRB in late June or early July. Plans are still taking shape, but we are inviting participants from the Governor's Blue Ribbon Panel on Ocean Acidification to overview the Panel's findings and recent report, and engage in discussion about state agency response. Stay tuned for more information in next month's news digest.

LEARNING OPPORTUNITIES

May 9th, 11-12:30 (PST), "Federal Climate Change Adaptation Policy: Trends, Actions and Examples" Sarah Murdock, Director, U.S. Climate Change Adaptation Policy, The Nature Conservancy.

This session will provide a brief history of the evolution of federal adaptation policy and action to the present day, highlight particularly promising policies and present examples from recent federal efforts as well as the Nature Conservancy. Readings are located at the following link:

<http://nctc.fws.gov/courses/climatechange/climateacademy/Readings.html>. This webinar is conducted through Adobe Connect – instructions to join follow:

- 1) **Before** the webinar test your connection at:
http://na1cps.adobeconnect.com/common/help/en/support/meeting_test.htm
- 2) At the **start of the webinar** please go to:
<http://nctc.adobeconnect.com/climateacademy05082013/>
- 3) Click Enter as "Guest" -- Note: "Guests are not admitted into this meeting" will appear until the start of the webinar
- 4) In the Name box please enter your "full name" – "your agency" – "# of people watching with you".
- 5) For audio via phone please dial: 1-866-692-3158 and enter passcode;45855126#

May 15, 10:00-11:30 (PST), "Case Study: Implementing Regional Adaptation Strategies: Ecological Assessment and Restoration of Springs in the Sky Island region in Arizona", Louise Misztal, Sky Island Alliance.

Sky Island Alliance is currently conducting a project to inventory, assess, and restore spring ecosystems in the Sky Island region as part of its effort to build resilience to climate change. Springs in arid regions occupy a small fraction of the landscape and yet support disproportionately high levels of productivity, endemism, and biodiversity. Project outcomes include new critical baseline data on springs, a regional database accessible to cooperating agencies that will house spring assessment information, identification of protection and restoration needs at springs, the restoration of 9 priority springs, and the assessment of restoration efficacy.

YOU MUST REGISTER TO JOIN THIS WEBINAR

<https://doilearn.webex.com/doilearn/k2/j.php?ED=148120957&UID=1166919912&HMAC=038ab953ca d6a465efc35d7559d114d8043c1d54&RT=MiMxMQ%3D%3D&FM=1>

THIS WEBINAR WILL BE RECORDED AND POSTED

Approximately 1-2 weeks after the presentation is given the webinar will be posted on our Climate Change website: http://training.fws.gov/CSP/Resources/climate_change/safeguarding_bc.html

May 22, 2013 – 1100-1:00 (PST), "Shared Solutions to Protect Shared Values: The National Fish, Wildlife and Plants Climate Adaptation Strategy"

The recently released National Fish, Wildlife, and Plants Climate Adaptation Strategy is the first nationwide strategy to help public and private decision makers address the impacts of climate change on our natural resources and the people and economies that depend on them. This collaborative effort led by the Fish and Wildlife Service, NOAA, and the state agencies is the product of an extensive national

dialogue that spanned nearly two years and was shaped by comments from more than 55,000 Americans. Join us to hear from the partners who developed this effort about how this Strategy provides a unified approach for reducing the negative impacts of climate change on natural systems, and discuss key recommendations for safeguarding the nation's fish, wildlife and plants in a changing climate. For more information on the Strategy, visit: www.wildlifeadaptationstrategy.gov

YOU MUST REGISTER TO JOIN THIS WEBINAR

THIS WEBINAR HAS BEEN RECORDED FOR FUTURE VIEWING -- If you cannot attend the webinar, a previous recording has been posted at www.wildlifeadaptationstrategy.gov

If you have questions regarding registration for this webinar, please contact: Danielle LaRock at danielle_larock@fws.gov

June 10th, 2013, Ocean Acidification Workshop, Department of Ecology HQ Building, Lacey, WA, 10:00-12:00, Dr. Amy Snover, Director of the Climate Impacts Group at the University of Washington, will present scientific information on climate change and ocean acidification in the Pacific Northwest and Washington State. Hedia Adelsman (Ecology) will provide an overview of mitigation and adaptation activities in the state and Ecology's role in climate change and ocean acidification. Limited seating is available for non-Ecology participants – you must RSVP with Lynn in advance to attend this workshop. *NOTE: WDFW is planning another workshop on Ocean Acidification here at the NRB in late June or early July. Plans are still taking shape, but we are inviting participants from the Governor's Blue Ribbon Panel on Ocean Acidification to overview the Panel's findings and recent report, and engage in discussion about state agency response. Stay tuned for more information in next month's news digest.*

June 10, 2013, 9am – 5:30pm, The Northwest Biocarbon Summit: Restoring Nature - Storing Natural Carbon, University of Washington Center for Urban Horticulture
Keynote Speaker: MacArthur David Montgomery, author of *Dirt: The Erosion of Civilizations*. Summit planners envision this event as the first step toward establishing our region as a leading laboratory and incubator for biocarbon solutions.

RESOURCES

[NorWeST Update](#)

The first results from the Region's new [NorWeST stream temperature data coordination and modeling effort](#) have recently been published for northern Idaho/NW Montana (other watersheds will be completed this year). The stream temperature climate scenarios for northern Idaho/NW Montana that were developed from data the local aquatics community contributed are now available on the NorWeST website (<http://www.fs.fed.us/rm/boise/AWAE/projects/NorWeST.html>). The stream temperature database for this area is a compilation from the more than 30 individuals and a dozen resource agencies and consists of 5,482 summers of monitoring effort at >2,100 unique stream sites. See the website for more information and a map showing expected completion dates for other watersheds.

EBM Tools Network Releases Free Guide to Coastal Climate Planning Tools

The potential impacts of climate change are already influencing the choices that coastal communities, resource managers, and conservation practitioners are making for ecosystems and infrastructure. To help planners and managers prepare for the far-reaching effects of these changes, the EBM Tools Network has released a free publication, "Tools for Coastal Climate Adaptation Planning: A guide for selecting tools to assist with ecosystem-based climate planning." The guide is designed to assist practitioners responsible for understanding and preparing for climate-related effects. In addition to

detailed information about a key collection of visualization, modeling, and decision support tools, the guide offers instructive case studies on how other professionals have successfully applied the tools in several coastal communities in the United States. The guide can be downloaded for free at: www.natureserve.org/climatetoolsguide.

National Ecological Observatory Network (NEON)

The [National Ecological Observatory Network \(NEON\)](#) encompasses a series of monitoring stations that will measure the health of ecosystems by taking snapshots from strategically chosen locations across the country. NEON is beginning to come online and will begin providing data later this year. The network will be fully operational by 2017 and is expected to continue its research for 30 years, giving scientists a vital long-term data set to understand how humans are impacting the environment.

New USA National Phenology Network [information sheets](#) synthesize recent changes in climate and phenology in eight U.S. regions.

This series of eight, geographic region-focused information sheets summarizes documented changes in plant and animal phenology over the past century across the United States.

All information is based on long-term studies (10 years or more) published in the primary scientific literature since 2001. The information sheets have been peer-reviewed through the USGS Fundamental Science Practices process.

NOAA Releases Activity Book: "Discover Your Changing World with NOAA" - Ten Activities to Introduce You to the Essential Principles of Climate Science

Are you ready to discover your changing world? This free activity book will introduce you to the essential principles of climate science, help you learn about Earth's climate system, the factors that drive and change it, the impacts of those changes, and what you can do to explore, understand, and protect our Earth. To download the full activity book or view individual activities, visit:

<http://oceanservice.noaa.gov/education/discoverclimate/>.

CLIMATE SCIENCE NEWS

[A warming world will further intensify extreme precipitation events](#)

According to a newly-published NOAA-led study in Geophysical Research Letters, as the globe warms from rising atmospheric concentrations of greenhouse gases, more moisture in a warmer atmosphere will make the most extreme precipitation events more intense. - [read more »](#)

[In Sign of Warming, 1,600 Years of Ice in Andes Melted in 25 Years](#)

Click on the article to see the change from 1978 and 2011 - amazing photos. "Glacial ice in the Peruvian Andes that took at least 1,600 years to form has melted in just 25 years, the latest indication that the recent spike in global temperatures has thrown the natural world out of balance. The evidence comes from a remarkable find at the margins of the [Quelccaya ice cap](#) in [Peru](#), the world's largest tropical ice sheet. Rapid melting there in the modern era is uncovering plants that were locked in a deep freeze when the glacier advanced many thousands of years ago. Dating of those plants, using a radioactive form of carbon in the plant tissues that decays at a known rate, has given scientists an unusually precise method of determining the history of the ice sheet's margins. [Lonnie G. Thompson](#), the [Ohio State University](#) glaciologist whose team has worked intermittently on the Quelccaya ice cap for decades, reported the findings in a [paper](#) released online"

Climate Change Seen Leaving Arctic Ice-Free by 2050

The Earth's northern polar region will be almost ice-free in the warmest months by 2050, sooner than previously estimated, according to a study by two federal government scientists who work on climate change. The researchers from the [National Oceanic and Atmospheric Administration](#) used three separate methods to predict the [sea-ice trends](#) in the [Arctic Ocean](#), and their estimates for 2020 to 2060 forecast elimination of most ice during the Northern Hemisphere's warmest months, according to a [statement](#). **The results show "very likely timing for future sea ice loss to the first half of the 21st century, with a possibility of major loss within a decade or two," according to the [paper](#)** by James Overland and Muyin Wang, who both study climate change and the Arctic. The paper was reviewed by other scientists and accepted for publication in *Geophysical Research Letters*. "The large observed shifts in the current Arctic environment represent major indicators of regional and global climate change," they wrote.

Volcanic Activity during 2000 to 2010 Provides Global Cooling Effect

Observations suggest that the optical depth of the stratospheric aerosol layer between 20 and 30 km has increased 4–10% per year since 2000, which is significant for Earth's climate. Contributions to this increase both from moderate volcanic eruptions and from enhanced coal burning in Asia have been suggested. Current observations are insufficient to attribute the contribution of the different sources. This study used a global climate model coupled to an aerosol microphysical model to partition the contribution of each. Comparison of the model results to observations reveals that moderate volcanic eruptions, rather than anthropogenic influences, are the primary source of the observed increases in stratospheric aerosol. Neely et al., *Geophysical research Letters*, advance publication online, March, 2013, DOI: 10.1002/grl.50263

SPECIES AND HABITATS

Sandy Beaches and Sea Level Rise

Attached is an article entitled, "Changing of the Guard: Adaptation Options That Maintain Ecologically Resilient Sandy Beach Ecosystems". This article provides an assessment of adaptation options, including hard and soft engineered options and ecosystem and conservation based alternatives, to evaluate their effectiveness at maintaining the ecological resilience of sandy beach ecosystems to sea-level rise. The authors propose adopting a multi dimensional perspective to enable coastal managers to better understand the consequences of implementing adaptation options.

Do stream fish track climate change? (Text excerpted from Dan Isaak's [Climate Aquatics Blog](#))

A new study (attached) published in *Ecography* by Lise Comte and Gael Grenouillet, entitled "Do stream fish track climate change? Assessing distribution shifts in recent decades" provides strong empirical evidence for broad-scale distribution shifts in dozens of stream fish species across France. Of the 32 species assessed, 25 showed evidence of upstream distribution shifts, as per the general predictions from the bioclimatic models. The shifts were not monotonic in nature although some types of shifts were much more common than others. The average rate of distribution shift at range center (0.6 km/decade) also lagged the average climate velocity in streams across France (14.2 km/decade) which means that species are often moving more slowly than their thermal niches. The fact that most fish species are behaving like their terrestrial brethren and shifting to higher elevations and cooler areas as the climate warms appears now to be largely corroborated.

(http://gael.grenouillet.free.fr/grenouillet_publications.html).

[Scientists seek sea urchin's secret to surviving ocean acidification](#) (from Science Daily)

“Stanford scientists have discovered that some purple sea urchins living along the coast of California and Oregon have the surprising ability to rapidly evolve in acidic ocean water -- a capacity that may come in handy as climate change increases ocean acidity. This capacity depends on high levels of genetic variation that allow urchins' healthy growth in water with high carbon dioxide levels.”

[Climate Change Keeps Expanding Canada's Unprecedented Epidemic Of Forest-Destroying Beetles](#)

Since the late 1990s, climate change has driven a massive expansion of forest-destroying Mountain Pine Beetles in Canada, delivering the country one of the worst ecological disasters in its history. The insects are not technically invasive, and until recently they existed in a natural balance with their environment; killing off older trees and making room for new growth. But as [a new documentary](#) chronicles, climate change eliminated many of the natural limits on the beetles' geographic spread and their rate of reproduction.

POLICY AND MANAGEMENT - MITIGATION AND ADAPTATION

['First Step' in Addressing Effects of Climate Change- Olympic Coast NMS](#)

A new report on the potential effects of climate change on NOAA's Olympic Coast National Marine Sanctuary uses existing observations and science-based expectations to identify how climate change could affect habitats, plants and animals within the sanctuary and adjacent coastal areas. It also outlines new management recommendations for the sanctuary, and sanctuary officials called it the first step toward addressing them. They also said the report issued by the sanctuary, [Climate Change and the Olympic Coast National Marine Sanctuary: Interpreting Potential Futures](#), will provide a foundation of information and identify key issues facing the sanctuary. "Climate change poses an increasingly grave threat to the health of the ocean, and its impacts will be felt in marine protected areas like the Olympic Coast sanctuary," said Carol Bernthal, sanctuary superintendent. "This report begins our work to develop management strategies that will help us anticipate potential challenges and adapt to the changing marine environment through sound science, public outreach, and partnerships."....> [full story](#)
Report: http://sanctuaries.noaa.gov/science/conservation/cc_ocnms.html

Survey by Stanford University Institute Finds that Americans Back Preparation for Extreme Weather and Sea-Level Rise

Stanford University's Woods Institute Senior Fellow Jon Krosnick recently directed a survey on climate adaptation that found that an overwhelming majority of Americans want to prepare in order to minimize the damage likely to be caused by global warming-induced sea-level rise and storms. A majority also want people whose properties and businesses are located in hazardous areas - not the government - to foot the bill for this preparation. The survey also measured support for climate adaptation measures, such as erecting sea walls or changing building codes to prevent new construction in risk-prone areas. The survey was commissioned by Stanford's Woods Institute for the Environment and the Center for Ocean Solutions. For more information, including a press release, summary of survey questions and responses, and a presentation on the findings, please visit:
<http://woods.stanford.edu/research/public-opinion-research/2013-Stanford-Poll-Climate-Adaptation>.

[Report: U.S. Makes 'Messy' Progress on Global Warming Policy](#) (excerpt from Jason Koebler, US News and World Report)

“A series of “messy but useful” alternative energy incentives, carbon regulation and innovation – mostly at the state level – has reduced the country's contribution to climate change, according to [The Policy Climate](#), a comprehensive report on climate change policy in India, Europe, Brazil, China and the United States. ‘There's a lot of angst or worry that we're not doing anything,’ says David Nelson, of the San Francisco-based Climate Policy Initiative and author of the report. “But quite clearly what we're doing has managed to stop the growth of emissions in a number of sectors.”

Over the past seven years, carbon emissions have fallen by 13 percent in the United States. A series of policy reforms focused on improving the economy, creating jobs and making the country less dependent on foreign oil have led to less carbon emissions overall. Tax credits for alternative energy sources, local antipollution laws, federal automobile fuel efficiency standards and new, more efficient energy technologies have led to a net overall positive. “When you put it all together, you're tying together a series of different policy objectives,” he says. ‘We're looking at energy security, creating new industries, curbing local air pollution, creating rooftop solar [power]. When you have multiple objectives other than just climate change, it's easier to justify those policies.’”