

Welcome to the **SEPTEMBER 2012** edition of the WDFW 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. We are particularly interested in projects or issues you may be involved in which have a climate change component. Remember that you can find previous editions on the [WDFW Climate webpage](#).

WHAT'S HAPPENING AT WDFW?

Selected projects, agency resources and initiatives

Climate Change and Prioritizing Basins for in-stream flow rules

The Water Science Team in the Habitat Program is working to expand the number of watersheds for which instream flow rules have been adopted. Instream flows are water rights which if enforced, protect streams from being dried up or severely depleted by new human water use. Existing water rights are senior to and cannot be impaired by instream flows, but instream flows ensure that *new* water rights do not make streams and rivers less suitable for fish. The Department of Ecology and Department of Fish and Wildlife work together to establish instream flows. Under RCW 90.82, enacted in 1997 by the Washington State Legislature, watershed plans were to be developed and instream flows adopted by watershed planning units convened by local governments. The process has progressed, but is now winding down with many watersheds not yet having adopted instream flows. WDFW is considering a number of factors in order to prioritize and promote those basins most critical for instream flow rules, including fish stock status, anticipated growth, and existing and future changes in water supply and hydrology. The last (but not least!) of these factors includes not only present climate and hydrology, but how those will change in the future. We are working to identify existing information at the watershed scale about climate change projections and effect on hydrology, in order to help prioritize these basins. For more information on this project, contact Hal Beecher.

LEARNING OPPORTUNITIES

September 20, 11:30-1:00 Pacific, Webinar, “Closing the loop: a full life cycle approach to understanding climate change and it’s impacts on long-distance migratory birds”

Dr. Peter Marra, Conservation Scientist, Smithsonian Institution’s Conservation Biology Institute. Dr. Marra will describe how climate influences tropical habitats, arthropod food availability and then individual bird condition. He will also show using stable carbon isotopes as a signature of winter habitat occupancy how climatic events on wintering grounds affects both arrival time and body condition of individual birds on breeding areas, and how these parameters influence reproductive

YOU MUST REGISTER TO JOIN THIS WEBINAR:

<https://doilearn.webex.com/doilearn/k2/j.php?ED=141906147&UID=1144192697&HMAC=ea98b4a69de391f1e7ecb82db422c0389476c9da&RT=MIMxMQ%3D%3D&FM=1>

Once submitted, your name will be added to the registry for the webinar and you will receive an email with instructions on how to join the webinar via WebEx platform.

If you cannot attend the webinar it will be posted approximately 1-2 weeks after the presentation is given and posted on the Office of the Science Advisor Webinar page:

<http://link.brightcove.com/services/player/bcpid1012811846001?bckey=AQ~~,AAAAv1RRo7E~,NyPVtyk dKxXTH1jgoXjy22F fAthM K8>

If you have any questions regarding registration for the OSA webinars, please contact: Danielle LaRock: [304.876.7476](tel:304.876.7476) or Danielle_LaRock@fws.gov or or Ashley Fortune: Ashley_Fortune@fws.gov

September 25, 10:00 AM, Webinar, "Controls of Summer Stream Temperature in the Pacific Northwest.

How does climate influence stream temperatures, as compared to other factors such as groundwater influence? Tim Mayer, Supervisory Hydrologist, Water Resources Branch, U.S. Fish and Wildlife Service. The webinar is hosted by C3. Tuesday Sept. 25, 10AM, Pacific Time. [Click here for the WebEx link](#). Call-in number: 877 952-8012 Passcode: 520083#

September 25, 10:00 AM, Webinar, "Habitat Climate Change Vulnerability Index"

The [Ecosystem-Based Management \(EBM\) Tools Network](#) is pleased to announce that it will host a demonstration of the Index by Pat Comer of NatureServe. Tuesday, September 25, at 10AM Pacific Time. Space is limited. Reserve your Webinar seat now at: <https://www1.gotomeeting.com/register/998022600>

September 26, 10:00-11:30 AM Pacific, Webinar, "Using Science-Management Partnerships to Adapt to Climate Change: National Forests and National Parks in Washington"

Dr. David L. Peterson

YOU MUST REGISTER TO JOIN THIS WEBINAR

<https://doilearn.webex.com/doilearn/k2/j.php?ED=140415567&UID=1145454037&HMAC=a86c09ce66f2092bec89b291984997f0ac3dc1af&RT=MiMxMQ%3D%3D&FM=1>

Once submitted, your name will be added to the registry for the webinar and you will receive an email with instructions on how to join the webinar via WebEx platform.

This webinar will be recorded. If you cannot attend the webinar it will be posted approximately 1-2 weeks after the presentation is given and posted on our Climate Change website:

http://training.fws.gov/CSP/Resources/climate_change/safeguarding_bc.html

September 26 11:00 AM, Webinar, Data for the coastal counties of California, Oregon, and Washington are now available at the NOAA Coastal Services Center's Sea Level Rise and Coastal Flooding Impacts Viewer. Visit <http://csc.noaa.gov/digitalcoast/tools/slrviewer>. To join webinar, enter as a guest at <https://noaacsc.adobeconnect.com/digitalcoast>.

September 27, 12:00 PM Pacific, Webinar, "Downscaling Climate Change Models to Local Site Conditions: Effects of Sea-Level Rise and Extreme Events on Coastal Habitats and Their Wildlife", John Y. Takekawa, PhD, Research Wildlife Biologist, USGS Western Ecological Research Center.

YOU MUST REGISTER TO JOIN THIS WEBINAR

<https://doilearn.webex.com/doilearn/k2/j.php?ED=142053887&UID=1144743672&HMAC=9375e86d5375eb12a013eded66039fefa5528b72&RT=MiMxMQ%3D%3D&FM=1>

Once submitted, your name will be added to the registry for the webinar and you will receive an email with instructions on how to join the webinar via the WebEx platform.

THIS WEBINAR WILL BE RECORDED

If you cannot attend the webinar, it will be posted, with closed captioning, approximately 1-2 weeks after the presentation is given and posted on the NCCWSC website:

<https://nccwsc.usgs.gov/webinars?q=webinar/117>

September 27, 2012; 2:00-3:00 PM Pacific, North Pacific LCC sponsored webinar, Developing Ecologically and Socially Robust Adaptation Frameworks for the LCCs.

Presenters: Drs. Dominick A. DellaSala and Marni Koopman, Geos Institute

Meeting Number: 747 242 508; Meeting Password: NPLCC

Join the online

meeting: <https://mmancusa.webex.com/mmancusa/j.php?ED=188910072&UID=484145102&PW=NOTIjNDhiNW12&RT=MiM0>

Join the conference call: Dial 1-866-628-1318; Attendee access code: 695 954 9

October 1-2, Boise, 3rd Annual PNW Climate Science Conference

The conference agenda is now available and can be accessed [here](#) along with registration information.

The Pacific Northwest Climate Science Conference provides an annual forum to exchange scientific results and policy and management options related to climate change and climate impacts research focused on the Pacific Northwest. The conference, entering its third year, will be held at the [Boise Centre](#) in Boise, Idaho on 1-2 October 2012. This year will feature a focus on climate impacts and issues in the Columbia Basin, and include special sessions on hydrology, aquatic and terrestrial ecosystems, agriculture, communication and climate change and adaptation responses.

November 8, 2012, Seattle -- Pacific Northwest Wetlands Symposium

This symposium is a forum for introducing & exchanging feedback on new resources for climate adaptation and management of Pacific Northwest wetlands. The goal is to support the production of new mapping and hydrologic modeling tools that are both useful (for actual resource management) and used (in the workflow). More generally, the symposium is an excellent opportunity to connect with managers, researchers and consultants working to enhance the conservation and management of wetlands in the face of climate change. For more details on the workshop agenda, go to <http://ecoadapt.org/workshops/detail/11> (A final agenda will be posted in the next month, so please check back for additional information.) To register please complete this short registration survey: [PNW Wetlands Symposium Survey](#).

RESOURCES

Climate Change for Forest Managers

Attached as a pdf is [a climate change newsletter](#) published by the California Forest Stewardship Program. The newsletter is targeted towards forest managers, and provides a general summary of the probable impacts of a changing climate on forests and forest health. The document acknowledges the uncertainty in developing adaptation responses, and explores how climate impacts might affect forest management decisions. Resource links for further learning are included.

EPA Releases BASINS and WEPP Climate Assessment Tools (CAT): Case Study Guide to Potential Applications (Final Report)

EPA and partners have developed two water and climate assessment modeling tools, the Better Assessment Science Integrating Point and Non-point Sources (BASINS) and the Water Erosion Prediction Project Climate Assessment Tool (WEPPCAT), that facilitate application of existing simulation models for conducting scenario-based assessments of potential climate change effects on streamflow and water quality. The report presents a series of short case studies using the BASINS and WEPP tools. The case studies are designed to illustrate the capabilities of these tools for conducting scenario-based assessments of the potential effects of climate, land use, and management change on water resources. This report is of interest to modeling professionals including water and watershed managers, urban or

regional planners, government officials, and scientists and engineers interested in using the BASINS or WEPP water models to assess the potential implications of climate change on water resources. For more information, visit: <http://cfpub.epa.gov/ncea/global/recordisplay.cfm?deid=242952>.

CLIMATE SCIENCE NEWS

[Paper Says Ocean Acidification Rate, at current pace, a threat to organisms, including salmon.](#)

The oceans may be acidifying faster today than they did in the last 300 million years, according to scientists publishing paper in the journal Science. “What we’re doing today really stands out in the geologic record, says lead author Barbel Honisch, a paleoceanographer at Columbia University’s Lamont-Doherty Earth Observatory. “We know that life during past ocean acidification events was not wiped out – new species evolved to replace those that died off. But if industrial carbon emissions continue at the current pace, we may lose organisms we care about – coral reefs, oysters, salmon”. In the last hundred years, rising carbon dioxide from human activities has lowered ocean pH by 0.1 unit, an acidification rate at least 10 times faster than 56 million years ago, says Honisch. The Intergovernmental Panel on Climate Change (IPCC) predicts that pH will fall another 0.2 units by 2100, raising the possibility that we may soon see ocean changes similar to those observed during the PETM.

Arctic sea ice hits record low, scientists say

Excerpt: Rafe Pomerance, former deputy assistant secretary of state for environment and development under President Bill Clinton, called the record low “a profound moment that will change the debate” over climate change. “It is very troubling, because the refrigerator of the Northern Hemisphere has been unplugged, so we will keep warming,” Pomerance said.

http://www.washingtonpost.com/national/health-science/arctic-sea-ice-hits-record-low-scientists-say/2012/08/27/0e11a63a-efe6-11e1-892d-bc92fee603a7_story.html?hpid=z2

More about the record low

[Sea Ice in Arctic Measured at Record Low](#)

Published: August 27, 2012 NY Times

The amount of sea ice in the Arctic has fallen to the lowest level on record, a confirmation of the drastic warming in the region and a likely harbinger of larger changes to come.

Satellites tracking the extent of the sea ice found over the weekend that it covered about 1.58 million square miles, or less than 30 percent of the Arctic Ocean’s surface, scientists said. That is only slightly below the previous record low, set in 2007, but with weeks still to go in the summer melting season, it is clear that the record will be beaten by a wide margin. The National Snow and Ice Data Center, a government-sponsored research agency in Boulder, Colo., announced the findings on Monday in collaboration with NASA. The agency bases its numbers on a slightly conservative five-day moving average of sea ice extent. The amount of sea ice in summer has declined more than 40 percent since satellite tracking began in the late 1970s, a trend that most scientists believe is primarily a consequence of human activity. “It’s hard even for people like me to believe, to see that [climate change](#) is actually doing what our worst fears dictated,” said Jennifer A. Francis, a Rutgers University scientist who studies the effect of sea ice on weather patterns. “It’s starting to give me chills, to tell you the truth.” Scientific forecasts based on computer modeling have long suggested that a time will come when the Arctic will be completely free of ice in the summer, perhaps by the middle of the century. This year’s prodigious melting is lending credibility to more pessimistic analyses that it may come much sooner, perhaps by the end of the decade. “It’s an example of how uncertainty is not our friend when it comes to climate-change risk,” said Michael E. Mann, a climate scientist at Pennsylvania State University. “In this case, the

models were almost certainly too conservative in the changes they were projecting, probably because of important missing physics.”

SPECIES AND HABITATS

[Delayed phenology and reduced fitness associated with climate change in a wild hibernator](#)

Researchers find a significant delay (0.47 days per year, over a 20-year period) in the hibernation emergence date of adult females in a wild population of Columbian ground squirrels in Alberta, Canada. This is found to have reduced fitness and population viability. Lane et al., 2012, *Nature*, Published online 08 August 2012 doi:10.1038/nature11335

Protected Areas Allow Wildlife to Spread in Response to Climate Change, Citizen Scientists Reveal

A new study led by scientists at the University of York has shown how birds, butterflies, other insects and spiders have colonized nature reserves and areas protected for wildlife, as they move north in response to climate change and other environmental changes. The study of over 250 species, led by researchers in the Department of Biology at York, is published online by the *Proceedings of the National Academy of Sciences (PNAS)* – **article attached**. The conclusions were based on the analysis of millions of records of wildlife species sent in predominantly by members of the public.

The work represents a major new discovery involving collaborators in universities, research institutes, conservation charities, and regional and national government but -- crucially -- fuelled by 'citizen science'. Many species need to spread towards the poles where conditions remain cool enough for them to survive climate warming. But doing this is complicated because many landscapes across the world are dominated by human agriculture and development, which form barriers to the movement of species. The mainstay of traditional conservation has been to establish protected areas and nature reserves to provide refuges against the loss of habitats and other threats in the surrounding countryside. But this method of nature conservation has been questioned in recent years, partly because of continuing degradation of habitats in reserves in some parts of the world. Increasingly, however, the value of protected areas is being questioned because climate change is taking place -- wildlife sites stay where they are while animal species move in response to changing conditions. However, the new research shows that protected areas are the places that most animal species colonize as they spread into new regions. "Protected areas are like stepping stones across the landscape, allowing species to set up a succession of new breeding populations as they move northwards," said lead author Professor Chris Thomas, of the University of York. "This study is a great example of how volunteer recorders and national monitoring schemes together provide the information to answer key conservation questions of global importance, such as how we can help wildlife cope with climate change," added James Pearce-Higgins of the British Trust for Ornithology. "Only through the dedicated effort of so many people can we undertake the scale of long-term monitoring required."

[Ecosystems Cope With Stress More Effectively the Greater the Biodiversity](#)

ScienceDaily— Ecosystems with a high degree of biodiversity can cope with more stress, such as higher temperatures or increasing salt concentrations, than those with less biodiversity. They can also maintain their services for longer, as botanists and ecologists from the universities of Zurich and Göttingen have discovered. Their study provides the first evidence of the relationship between stress intensity and ecosystem functioning. Higher average temperatures and increasing salt concentrations are stress factors that many ecosystems face today in the wake of climate change. However, do all ecosystems react to stress in the same way and what impact does stress have on ecosystem services, such as

biomass production? Botanists and ecologists from the universities of Zurich and Göttingen demonstrate that a high level of biodiversity aids stress resistance. In all, the researchers studied six different intensities of two stress gradients. In the case of very high intensities, the positive effects of biodiversity decreased or ceased altogether. However, increasing stress in systems with few species had a considerably more negative impact than in those with high biodiversity levels. "The study shows that a high degree of biodiversity under stress is especially important to maintain biomass production," says Steudel's PhD supervisor Michael Kessler, summing up the significance of the research project.

[Salamanders Display Survival Techniques in Period of Extreme Drought](#)

The stress of drought is acutely felt by aquatic animals such as salamanders. The extreme drought in the southeastern United States in 2007-2008 provided an opportunity to study how salamanders react and survive during such dry conditions. It also gave us clues as to how salamanders and other aquatic organisms may react to global warming. The journal *Herpetologica* reports on a 5-year study of the Northern Dusky Salamander, common to eastern North America. From 2005 to 2009, including two severe drought years, the presence of salamanders was recorded at 17 first-order streams in the Piedmont region of North Carolina. Researchers found that the adult salamanders had a high rate of survival over the course of the study, even during the drought years. The abundance of larval salamanders, however, decreased by an average of 30 percent during the drought. This differential mortality suggests a between-generation survival strategy, with the high survival rate of adults mitigating the effect of drought on the numbers of larvae.

During the extreme drought, water levels reached a 110-year low. Many streams were dry for periods of 2 to 3 months at a time, reduced to pools rather than flowing water. These conditions brought about another survival strategy, temporary migration of adult salamanders -- at twice the rate of non-drought years. They moved from stream beds to underground or high-humidity refuges. Crayfish burrows and rocks provided shelter from the hot and dry conditions. Because climate change is expected to bring warming trends and more drought, this study offers implications for the survival of stream-dwelling salamanders. An increase in the mortality of larvae, or early metamorphosis, could mean declines in salamander fitness and size.

POLICY AND MANAGEMENT - MITIGATION AND ADAPTATION

[Leading Global Companies Say 'Tangible And Present' Climate Change Is Already Creating Business Risk](#)

The number of large corporations reporting current risks from climate change has grown substantially over the last two years. According to [a survey](#) of 405 of the biggest global companies conducted by the Carbon Disclosure Project, 37 percent say they are already seeing the impact of climate change on their business — up from 10 percent in 2010.

The Carbon Disclosure Project attributes the increase in companies worried about current climate risks to the [rise in extreme weather](#) globally: Recent extreme weather and natural events have tested companies' business resilience and increased their level of understanding of the timeframes of the physical risks they associate with climate change. **Physical risks are viewed as tangible and present, impacting companies' operations, supply chains and business planning.** The majority of companies (81%) report physical risks and the percentage of companies that view these risks as current has nearly quadrupled from 10% in 2010 to 37% in 2012. Insurance company Allianz reports that in 2011 it processed \$2.2 billion in natural catastrophe (including non-weather related) claims, the largest sum for natural catastrophes in its history. So far this year, America has seen [the most extreme period](#) for

weather ever recorded. The country is on track to surpass last year, when there were [14 extreme weather events](#) that each caused more than a billion dollars in damage — the most in U.S. history. In response to these tangible impacts, more large companies are crafting strategies for addressing climate change. According to the survey, 78 percent of responding companies are factoring climate into their business plans, up from 68 percent in 2011.