

National Marine Sanctuaries
National Oceanic and Atmospheric Administration



NATIONAL MARINE
SANCTUARIES

OLYMPIC COAST



Pacific Northwest B-WET FY2019 Federal Funding Opportunity

Presented by



Jacqueline Laverdure
Pacific Northwest B-WET Program Coordinator

and



Kevin Grant
Pacific Northwest B-WET Program Grant Manager

Welcome. Thank you for attending this informational webinar on Pacific Northwest B-WET FY2019 Federal Funding Opportunity.

2019 Pacific Northwest BWET Application Review

- What is B-WET
- Definition of MWEE
- Program Priorities
- Application Package
- Evaluation Criteria
- Review Process
- NOAA Resources
- Questions



https://olympiccoast.noaa.gov/ocean_literacy/bwet.html

The presentation is 1 ½ hours with one hour of presentation, followed by 30 minutes of Q & A.

Today, we will go over:

- What is B-WET
- the Definition of a MWEE
- Program Priorities
- the Application Package
- Evaluation Criteria
- the overall review process

I have invited some NOAA partners to provide a brief overview of their resources that may support MWEEs.

Kevin and I will be available following the presentation, and by phone or email throughout the application period, to answer any questions or concerns you may have about this funding opportunity.

– all information included in this webinar about the funding opportunity can also be found in the Federal Funding Opportunity announcement, and information regarding the resources can be found on NOAA websites.

B-WET Program

Bay Watershed Education and Training (B-WET)
promotes locally relevant, experiential learning

- California
- Chesapeake Bay
- Great Lakes
- Gulf of Mexico
- Hawaii
- New England
- Pacific Northwest



www.NOAA.gov/office-education/bwet

NOAA's B-WET program is an environmental education program that promotes locally relevant, experiential learning in the K-12 environment.

B-WET currently serves seven areas of the country – California, Chesapeake Bay, Great Lakes, Gulf of Mexico, Hawaii and Pacific Northwest.

For the purposes of this federal grant opportunity, the Pacific Northwest region is defined as Oregon and Washington.



- **The primary delivery is through competitive grants that promote Meaningful Watershed Educational Experiences (MWEEs).**
- **Eligible applicants are K-12 schools and school systems, institutions of higher education, community-based and nonprofit organizations, state or local government agencies, interstate agencies, and Indian tribal governments.**

The primary delivery of B-WET is through competitive grants that promote Meaningful Watershed Educational Experiences (MWEEs).

Eligible applicants for the Pacific Northwest B-WET grant are K-12 schools and school systems, institutions of higher education, community-based and nonprofit organizations, state or local government agencies, interstate agencies, and Indian tribal governments.

For-profit and federal government agencies are not eligible for this grant, but they can act as project partners to the grant.

Applicants and recipients are required to continue to maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency.

(See Section IV. C. Unique Entity Identifier and System for Award Management (SAM) p. 22)

Applicants and recipients are required to continue to maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency.

Registration may take some time, so if you haven't already registered, please be sure to do so as soon as possible. If you believe that you already have a SAM account, it's also a good time to check that it is still active and that the contact person is still appropriate for your organization.

Electronic applications must be received by 8:59 p.m. Pacific Time /11:59 p.m. on December 21, 2018 to be considered for funding. Applicants are strongly encouraged to apply online through www.Grants.gov.

Use of Grants.gov requires an advance registration process that may take a few days or several weeks.

Keep in mind that it may take Grants.gov up to two business days to validate or reject a submitted application.

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If Grants.gov has technical issues that prohibit submission or is otherwise impractical, hard copy applications will be accepted. Hard copies may be submitted by postal mail, commercial delivery service, or hand-delivery, but must be received (not postmarked) by 5:00 p.m. Pacific Time on December 21, 2018. Hard copy applications arriving after the deadline will be accepted for review only if the applicant can document that the application was provided to a delivery service that guaranteed delivery prior to the specified closing date and time.



NOAA adopted this definition of the MWEE in order to assist grantees in developing effective projects.

MWEEs for students should be learner centered -

1. **RESEARCH:** Students should focus on an environmental question, problem, or issue requiring research and investigation. This may be done through classroom instruction, data collection, experiments, talking with experts and reviewing credible publications.

2. **FIELD ACTIVITIES** - Students should participate in multiple outdoor field activities sufficient to collect data or make observations required for answering the research questions and informing student actions, or as part of the issue definition and background research. Pacific Northwest B-WET funded projects should aim to include more than 4 hours of student activity time spent outdoors.

3. **ACTION PROJECTS:** Students should participate in age appropriate projects during which they take action to address the environmental issues. These may be personal actions or actions that focus on the community or more global audiences.

1. Examples include watershed restoration or protection (creating a schoolyard habitat, planting trees, removing invasive species, a community cleanup, storm-water management) ;
 2. Everyday choices (reduce /reuse / recycle, composting, energy or water conservation),
 3. Community engagement (presentations, social media, event-organizing, messaging at community events, mentoring, Public Service Announcements, flyers or posters),
 4. Civic Action (town meetings, letter writing, meeting with public officials to learn about policy aspects of watershed monitoring or habitat restoration)
-
1. **CONCLUSIONS:** Students should analyze and evaluate the results of projects and investigations. They should synthesize and communicate results to external audiences such as other classrooms, schools, parents, or the community.



In addition to the components identified in the previous slide, NOAA recommends that the following elements are in place to fully support successful MWEE implementation with students.

1. **TEACHER PARTICIPATION & INTEGRATION WITH CLASSROOM CURRICULUM**- Teachers should support the experience in the classroom and in the field. To support this role, teachers should have appropriate knowledge of environmental issues and watershed concepts, skill in connecting these issues to their curriculum, including confidence to teach outdoor lessons and to lead students in critical thinking about environmental issues. Experiences should also be integrated into what is occurring in the classroom.
2. **LOCAL CONTEXT** -The local community and environment should be viewed as the primary resource for the student MWEE.
3. **A SET OF ACTIVITIES OVER TIME** - The MWEE includes the full duration leading up to and following the outdoor field experiences. Each component should involve a significant investment of instructional time, incorporate time for reflections, and include all the

students. Experiences such as tours, simulations, demonstrations, or nature walks may be instructionally useful, but alone do not constitute an entire MWEE as defined here.

4. Includes NOAA assets, including NOAA data, personnel, facilities, curriculum and / or resources.

NOAA Resources



- NOAA Assets:
http://www.oesd.noaa.gov/grants/NOAA_assets.html
- NOAA in Your Backyard:
http://www.education.noaa.gov/Special_Topics/NOAA_in_Your_Backyard.html
- NOAA personnel – Please contact NOAA representatives early in their planning process

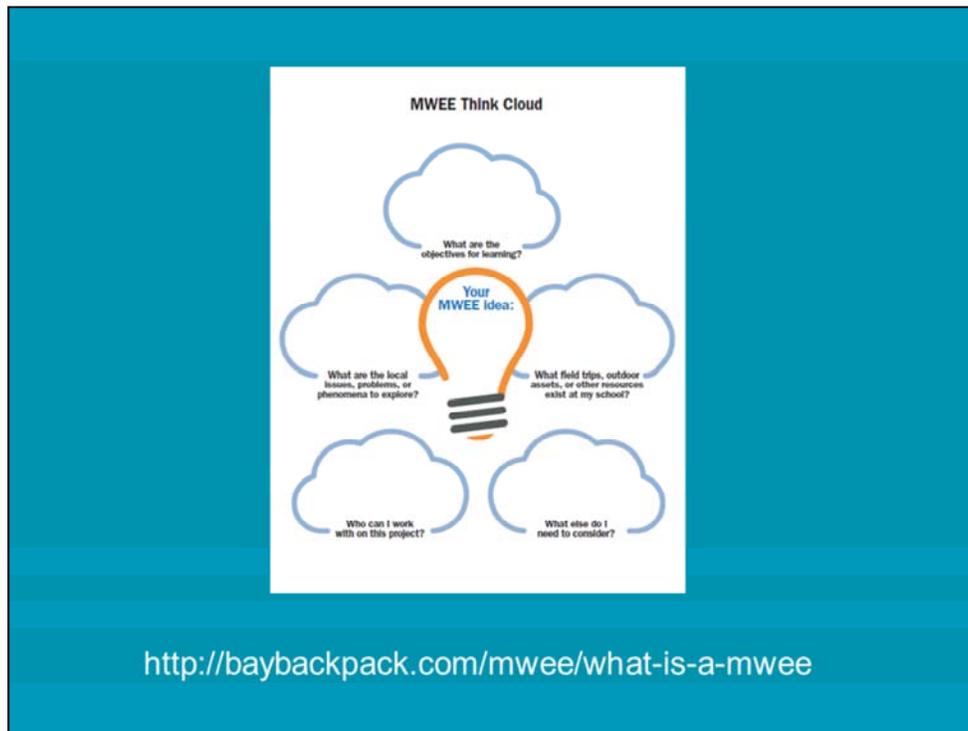


To prepare teachers to effectively support MWEES, it is recommended that teacher professional development include these elements –

1. Trainings should provide sufficient level of content specific to their grade level and discipline, including an understanding of basic watershed concepts and the human connection to the watershed.
2. Trainers should use the same techniques and experiences in trainings that teachers are expected to use with their students. This includes hands-on, place-based, outdoor field experiences and issue investigation and action.
3. Professional development trainings should be multi-day, occurring consecutively or over the course of several months. Trainings should include plenty of time for teachers to reflect on their own teaching practices and include planning time / discussions on how to use the new knowledge and skills in the classroom with their students. B-WET program recommends that professional development include more than 30 hours of professional development time, of which more than 10 hours should be spent outdoors.

4. Programs should provide ongoing teacher support and incentives. Ongoing support can be meetings, web-based forums for communication and feedback, mentor teachers, or teams of teachers. Continuing education credits and stipends can be used to encourage participation in on-going professional development opportunities.

5. When possible, professional development opportunities should support established guidance and recommendations set forth by local education agencies.



Some of our national B-WET partners, the Chesapeake Bay Program, developed a new resource to support MWEES, called the Bay Back Pack. It was developed for Chesapeake Bay, but can be applied to MWEES in any region. It has resources for developing, promoting and funding your MWEE project.

Go to <http://baybackpack.com/mwee/what-is-a-mwee> to download the guide and toolbox.

2019 Program Priority



Long-term classroom-integrated
Meaningful Watershed Educational Experiences
(MWEEs) for Students combined with
Teacher Professional Development for MWEEs
that demonstrate a connection to the ocean
environment through the watershed system.

The 2019 Pacific Northwest B-WET Program Priority is Long-term classroom-integrated Meaningful Watershed Educational Experiences (MWEEs) for Students combined with Teacher Professional Development for MWEEs that demonstrate a connection to the ocean environment through the watershed system.

The idea is that students understand how their actions can affect the coastal/ocean environment through the watershed system.

Priority will be given to programs that:



- incorporate science and stewardship activities focused on the issues of ocean acidification and hypoxia.
- serve underserved or underrepresented audiences
- show prior experience in working in the Pacific Northwest region; and or
- demonstrate partnerships with local organizations in the Pacific Northwest region on proposed projects.

Additional priority will be given to projects that incorporate science and stewardship activities focused on the issues of ocean acidification and hypoxia; serve underserved or underrepresented audiences; show prior experience in working in the Pacific Northwest region; and or demonstrate partnerships with local organizations in the Pacific Northwest region on proposed projects.

Applicants should clearly show total anticipated contact time with project participants (teachers in professional development and students), and indicate how much of this time will be spent outdoors.



Applicants should clearly show total anticipated contact time with project participants, and indicate how much of this time will be spent outdoors.

Project proposals should:

- include more than 30 hours of professional development, of which more than 10 hours should be spent outdoors.
- aim to include more than 4 hours of student activity time spent outdoors.



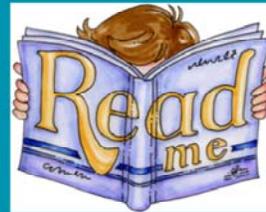
Based on national evaluation results, B-WET projects should include more than 30 hours of professional development, of which more than 10 hours should be spent outdoors.

And aim to include more than 4 hours of student activity time spent outdoors.

Application Package

- Project Summary (1-page limit)
- Project Description (15 page limit)
- Literature cited
- Letters of commitment / collaboration
- Budget and Budget Justification
- Resumes
- Data Sharing

***Please refer to 2019 Pacific Northwest Bay-Watershed Education and Training Federal Funding Opportunity Announcement for full details of application package and requirements



The application package will consist of:

Project Summary (1-page limit)

Project Description (15 page limit)

Literature cited

Letters of commitment / collaboration

Budget and Budget Justification (please be sure to round to the nearest dollar)

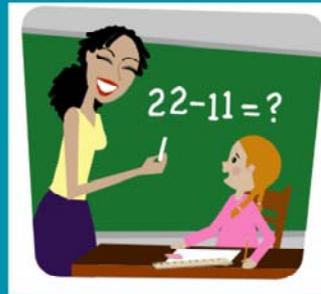
Resumes

Data Sharing

Evaluation Criteria

1. Importance and / or relevance and applicability of proposal to the program goals;
2. Technical Merit;
3. Overall qualifications of applicants;
4. Project costs;
5. Outreach and Education

***Please refer to 2019 Pacific Northwest Bay-Watershed Education and Training Federal Funding Opportunity Announcement for full details of Evaluation Criteria



See Federal Funding announcement for full details

Evaluation Criterion #1 – 60 points Importance / Relevance to Program Goals

- MWEEs for students are learner centered and focused on questions, problems, and issues to be investigated
- MWEE is an integral part of the instructional program
- Project includes Teacher Professional Development to support MWEEs
- Project incorporates science and stewardship activities focused on the issues of ocean acidification and hypoxia
- Project substantially serves underserved or underrepresented audiences
- Projects incorporate NOAA and environmental literacy resources

***Please refer to 2019 Pacific Northwest Bay-Watershed Education and Training Federal Funding Opportunity Announcement for full details of Evaluation Criteria

1. Importance and/or relevance and applicability of proposal to the program goals and priorities (60 points)

- addresses the basics of a MWEE as defined in the announcement, including that projects aim to include more than 4 hours of student activity time spent outdoors, and include more than 30 hours of professional development, of which more than 10 hours should be spent outdoors.
- This criterion also includes program priorities that the project incorporates science and stewardship activities focused on the issues of ocean acidification and hypoxia and that the project substantially serves underserved or underrepresented audiences.
- This criterion also includes program requirements that project incorporate appropriate NOAA resources

Evaluation Criterion #2– 15 points Technical Merit

- Proposal meets all technical requirements and objectives
- Applicant demonstrates partnerships through letters of support and partner involvement
- Applicant demonstrates how the project outcomes will be evaluated.



***Please refer to 2019 Pacific Northwest Bay-Watershed Education and Training Federal Funding Opportunity Announcement for full details of Evaluation Criteria

Evaluation Criterion #3 – 5 points

Overall qualifications of applicants

- Applicant shows capability and experience in successfully completing similar projects
- Proposal includes resumes of staff members included in project
- Applicant demonstrates experience working with underserved or underrepresented communities
- Applicant shows experience working in the Pacific Northwest

***Please refer to 2019 Pacific Northwest Bay-Watershed Education and Training Federal Funding Opportunity Announcement for full details of Evaluation Criteria

Evaluation Criterion #4 – 10 points

Project costs

- Budget request is reasonable and justifiable
- Significant percentage of the budget is directly related to bringing students in contact with the environment
- Any administrative costs are consistent with Federal requirements and effectively support project implementation
- Funds for salaries and fringe benefits are only for those personnel who are directly involved in implementing the proposed project
- Applicant demonstrates sustainability beyond the project period and that the project will continue after NOAA funding has expired

***Please refer to 2019 Pacific Northwest Bay-Watershed Education and Training Federal Funding Opportunity Announcement for full details of Evaluation Criteria

Evaluation Criterion #5 – 10 points Outreach and Education

- Project involves well-developed external sharing and communication
- Proposal describes how target audience will share their findings, experiences, or results with their peers or their community

***Please refer to 2019 Pacific Northwest Bay-Watershed Education and Training Federal Funding Opportunity Announcement for full details of Evaluation Criteria

Review Process

- Technical Review – January – February 2019
- Panel Review – February 2019
- Negotiations and Recommendations – Spring 2019
- Notification if not recommended for funding – Spring 2019
- Availability of funds – based on Federal Budget
- Award notices – June / July 2019



Applications will be evaluated by a two-part review process; a preliminary technical review and a panel review. Both phases are conducted by the same set of reviewers.

1. Technical Review - Each application will be reviewed by a minimum of 3 reviewers. Reviewers provide comments (which are shared with applicants after the competition has concluded) and assign scores to the applications based the evaluation criteria in the federal funding opportunity announcement. From this, we will determine a preliminary rank order based on reviewers ratings.
2. Panel Review – An in-person review panel will come together to evaluate the rankings and comments from the Technical Review and discuss the proposals as a group. During the panel meeting, reviewers can revise their scores and comments. Reviewers must individually submit final ranking to the B-WET Program Manager by the end of the panel meeting.
3. The reviewers' final ranking will be averaged for each application to produce a rank order of the proposals for each of the panels.

4. Using the recommendation on each discussed proposal, the Program Manager will calculate a “percent recommended” for each discussed proposal. This establishes a final rank order for funding that is provided to the Selecting Official.

Examples of NOAA Resources that support MWEEs



Olympic Coast
National Marine Sanctuary
By Nicole Harris
Education Specialist
Nicole.Harris@noaa.gov

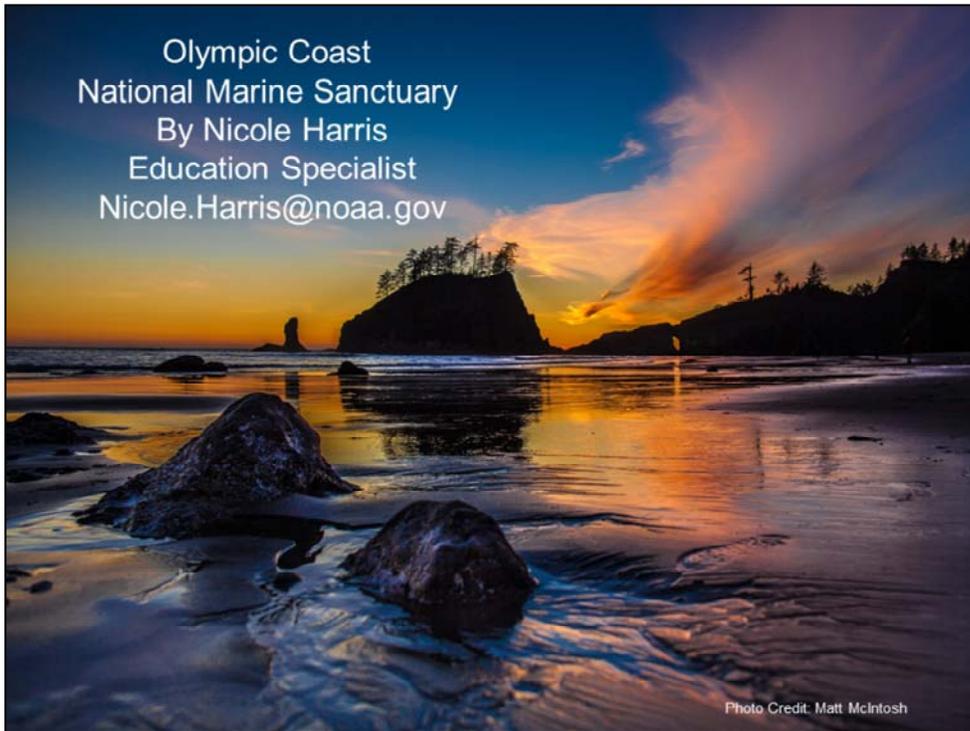


Photo Credit: Matt McIntosh

Olympic Coast National Marine Sanctuary



Designated in 1994

3,188 sq miles of marine waters

~135 mi of coastline, some of it designated wilderness. Washington has the longest stretch of wilderness coastline in the lower 48 states.

Protects a variety of marine resources:

29 species of marine mammal visit sanctuary waters

It also attracts some of the largest seabird colonies in the continental U.S.

Rich maritime history- over 200 documented ship wrecks

Diversity of Habitats:

- Rocky and Sandy intertidal

- Nearshore Kelp Beds

- Submarine Canyons

- Subtidal reefs

Complements adjoining protected areas (ONP, Washington Islands National Wildlife Refuges, Washington State Seashore conservation

areas)

Millennia of tribal culture - The area within the Usual and Accustomed fishing grounds of the Hoh, Makah, and Quileute Tribes and the Quinault Indian Nation. The sanctuary co-manages the resources with the four Coastal Treaty Tribes.

The Outdoor Classroom



Olympic Coast National Marine Sanctuary is a natural outdoor classroom. With 135 miles of shoreline, and public access along state parks - Pacific Beach and Olympic National Park – (2nd beach, Ruby Beach, Beach 4, or Kalaloch Beaches) as well as the potential for tribal granted access to tribal lands

You can explore and collect data on ...

- Intertidal zones
- Sand studies
- Water Quality
- Marine Debris surveys

We can provide you with electronic field guides and student data sheets to enhance your field investigation in the nearshore marine environment.

- Intertidal field guide
- Intertidal data sheet
- Marine debris student shoreline survey

Teacher Professional Development



Teacher Professional Development Workshops support MWEs by providing skills, confidence and resources to your teachers to support students in the field. If provided enough early notice, and if available, Olympic Coast National Marine Sanctuary educators may come to your teacher professional development workshop to provide either in-classroom activities (EX: ocean acidification hands-on activities, food web modeling) or in the field activities (EX: intertidal monitoring, marine debris investigations)

West Coast Region Sanctuaries

The screenshot shows a website titled "Understanding Ocean Acidification" with a blue background. At the top, a large white text reads "West Coast Region Sanctuaries". Below it, the main heading "Understanding Ocean Acidification" is displayed. A central video player area features a sea turtle and text: "Our carbon emissions are making the ocean more acidic, which threatens life in our seas. Use these resources to educate yourself and others and take action. Watch the video". Below the video are four columns of resource cards: "Workshops" (Presentations from the Understanding Ocean Acidification workshops), "Hands-On Activities" (Find lesson plans and projects that show CO₂'s effect on ocean acidity and sea life), "Useful Links" (Continue learning from additional websites, FAQs, videos and reports available online), and "Take the Pledge" (Commit to change. Explore what you can do to reduce CO₂ emissions and make your ocean pledge). At the bottom, a "Did you know?" section states: "Each year, the ocean absorbs approximately 25% of the CO₂ we emit."

National marine sanctuaries of the West Coast pulled together resources and activities to help our population understand ocean acidification.

This website, acidocean.org – includes hands-on activities, videos, PowerPoints and lesson plans that your students and teachers can sink their teeth into as they explore and investigate our changing ocean and the impacts of a lower pH on our marine environment.

OA Activities



Exploring pH

Low pH waters on calcium carbonate shells



Dry Ice Demos

Whale Jenga

Lego shell building

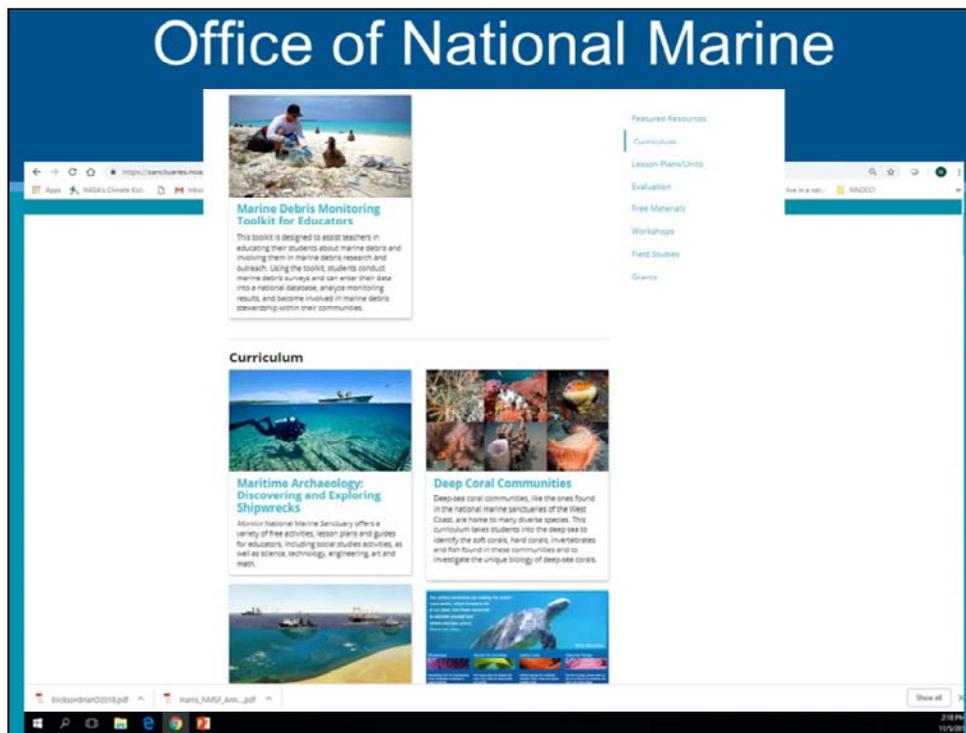


Through these activities, you can take your students on an exploration of pH waters and its effects on calcium carbonate shells.

Download and play fun and educational games like Whale Jenga or the Lego shell building game, as well as Dry Ice Demos and links to online activities.

Ocean Acidification





Another great resource is the Office of National Marine Sanctuaries website,

From the homepage you go to learn, then education, then for teachers – where you will see the featured resources right at top as well as links to specific curriculums or lesson plans.

<https://sanctuaries.noaa.gov/education/teachers/>

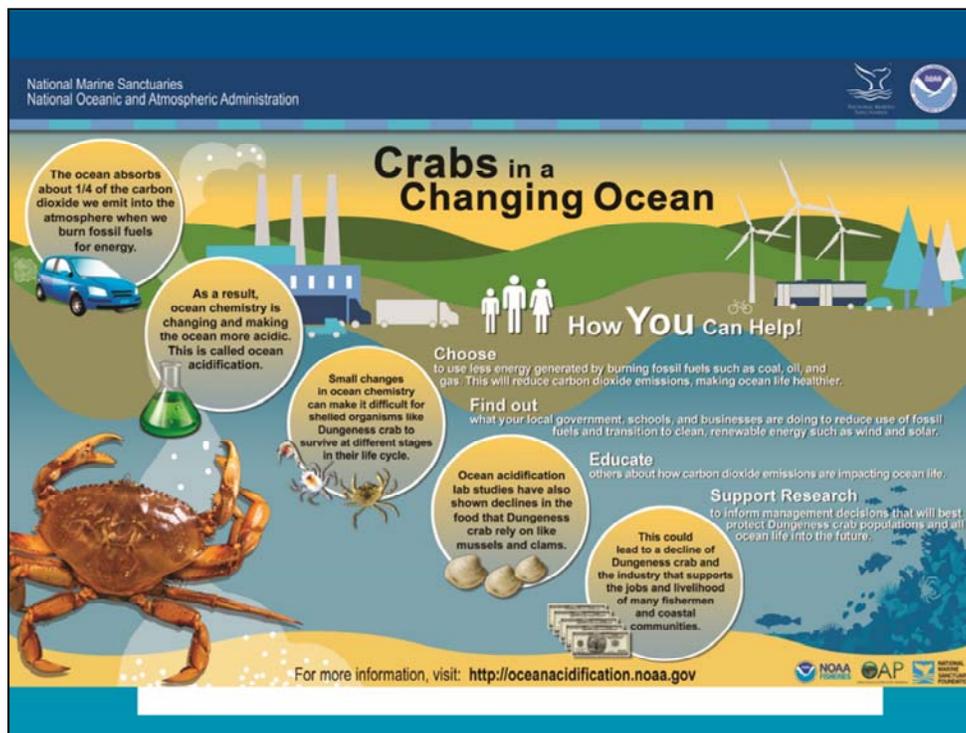
National Marine Sanctuaries



<https://sanctuaries.noaa.gov/education/>

A few examples of the resources available to you include:

- The National Marine Sanctuary Lesson Plan, where you can learn all about our nation's marine sanctuaries which is a great internet research activity for the classroom.
- You can also take your watershed experience to the deep sea, with the Deep Sea Coral Curriculum and explore the west coast's deep sea corals, and the potential impacts of our changing ocean on this unique habitat and organisms. This curriculum includes lesson plans, PowerPoints, videos, data sheets and field guides to explore the deep sea – perhaps the next best thing to diving right in...



We also have a newly developed resource available on the Office of National Marine Sanctuaries site (<https://sanctuaries.noaa.gov/education/crab-toolkit.html>) which is the West Coast Region Dungeness Crab Tool Kit

Knowing the importance of Dungeness crab fishery to our west coast communities, this toolkit includes

- A fact sheet
- PowerPoint slideshow and script
- Infographic
- B-roll footage of crab in their natural habitat and lab
- Resource list
- And a reference list to go along with the fact sheet and PowerPoint.

Ocean Acidification



And last but certainly not least, we have our SOARCE (Sharing Ocean Acidification Resources for Communicators & Educators) webinars put on by NOAA's Ocean Acidification Program (OAP) - <https://oceanacidification.noaa.gov/WhatWeDo/EducationOutreach/SOARCEWebinars.aspx>

SOARCE Webinars are a great resource to share with your educators and teachers you work with for information on ocean acidification projects – with the webinars showcasing a variety of research projects, curriculum and education tools, - once you are registered for the webinar, you have access to their SOARCE archive.

SOARCE webinars could also be a platform you could use to share your own projects.

For more information contact Jacqueline.laverdure@noaa.gov or Nicole.harris@noaa.gov



Padilla Bay is a site in the National Estuarine Research Reserve System – the only reserve in Washington State. It's claim to fame is its 9000 acres of eelgrass.



Our education staff provides on-site programs for over 6000 school students each year. We have an interpretive center with aquariums and exhibits about the Salish Sea estuary.



The Skagit Stream Team is a volunteer Citizen Science project that monitors water quality in the Skagit, Samish, and Padilla Bay watersheds. Over 70 volunteers measure temperature, dissolved oxygen, and fecal coliform in streams and bays.



The annual Youth Earth Summit is a conference for high school environmental clubs. Held in early December, it provides students an opportunity to share with other schools, learn from professionals in environmental fields, design projects to address environmental issues in their schools and communities, and explore environmental careers.

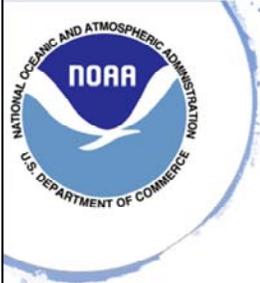


Padilla Bay offers professional development for classroom and informal educators. Our current project is a middle school and high school level workshop focused on climate change, ocean acidification, and teaching data literacy using local and real-time data.

Padilla Bay National Estuarine
Research Reserve



Contact:
Susan Wood
swoo461@ecy.wa.gov



**South Slough National
Estuarine Research Reserve**

- Oregon's south coast.
- One of 29 reserves in the US, designated to protect and study estuarine systems (where rivers meet the sea)

Contact: Jaime Belanger, Education Coordinator
jaime.c.belanger@state.oc.us
541-888-5558, x127
southsloughestuary.org

Located in Charleston, Oregon. The first NERR, established in 1974 through the Clean Water Act. State-federal partnership between NOAA and the Oregon Department of State Lands (DSL). Primary mission is to ensure the stewardship and understanding of Pacific estuaries and coastal systems through research and education.

Reserve resources:

- Experienced educators familiar with inquiry-based learning, as well as planning and implementing MWEEs.
- 5000 acres of upland forest, fresh and salt water marshes, mudflats and open water with active scientific research, restoration and monitoring.
- Field trips for K-12 audiences.
<https://www.oregon.gov/dsl/SS/Pages/EdResources.aspx>
- Professional development for educators.
<https://coast.noaa.gov/estuaries/teachers-on-the-estuary/calendar.html>



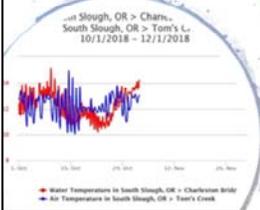
School programs and teacher trainings are



Resources continued:

- Educators who visit classrooms or facilitate virtual field trips.
<https://www.oregon.gov/dsl/SS/Pages/EdResources.aspx>
- Online tools and curriculum.
<https://coast.noaa.gov/estuaries/>
- Near-real time water quality and weather data; long-term data sets.
<http://cdmo.baruch.sc.edu/dges/>

South Slough, OR > Charn,
South Slough, OR > Tom's L.
10/1/2018 - 12/1/2018



Water Temperature in South Slough, OR - Charleston Bridge
Air Temperature in South Slough, OR - Tom's Creek

CONTACT INFORMATION

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southsloughestuary.org

facebook.com/SouthSloughEstuary/





Casey Ralston

Education Coordinator
Northwest Fisheries Science Center
<https://www.nwfsc.noaa.gov/education>



Alicia Keefe

Education and Outreach Coordinator
NOAA Fisheries West Coast Region

Agenda

1. Where We Work

2. What We Work On

3. Education Resources

- Careers
- Ecosystem Connections
- Climate and Community Resilience
- Species- Killer Whales and Salmon

1. Where we Work

2. What we Work On

3. Education Resources

- Careers
- Ecosystem Connections- OA, Food Webs
- Climate & Community Resilience
- Species- Killer Whales and Salmon

Where We Work

Northwest Fisheries Science Center (Orange)

- Stock Assessments (90+ W. Coast GF)
- Species Recovery (Salmon, Rockfish, SRKW)
- Ecological Forecasting
- Watershed Science & Habitat Restoration
- Toxicology & Environmental Chemistry
- Aquaculture (Research and Restoration)
- Marine Forensics
- Integrated Ecosystem Assessments

NOAA Fisheries West Coast Region (Blue)

- Sustainable Fisheries Division
- Protected Resources Division

U.S. Department of Commerce | National Oceanic and Atmospheric Administration | NOAA Fisheries | Page 49

- Majority of NMFS Species in the Spotlight (6/8)
 - [Central California Coast coho](#)
 - [Pacific leatherback sea turtle](#)
 - [Sacramento River winter-run chinook](#)
 - [Southern resident killer whale](#)
 - [White abalone](#)
- Most work centers around salmon and SRKW

NWFSC

West Coast Region

Sustainable Fisheries Division

Oversees the conservation of marine resources and the management of sustainable commercial, recreational, and tribal fisheries on the West Coast.

Protected Resources Division

- Reviews species' status to determine if listing is warranted
- Develops protective regulations to conserve listed species

- Designates critical habitat
- Authorizes scientific research permits that will benefit protected species

Sustainable Fisheries and Jobs



Resources

- [Voices from the Fisheries](#)

Safe Seafood



- Harmful Algal toxins
- Contaminants
- Microbes



Seafood Inspection

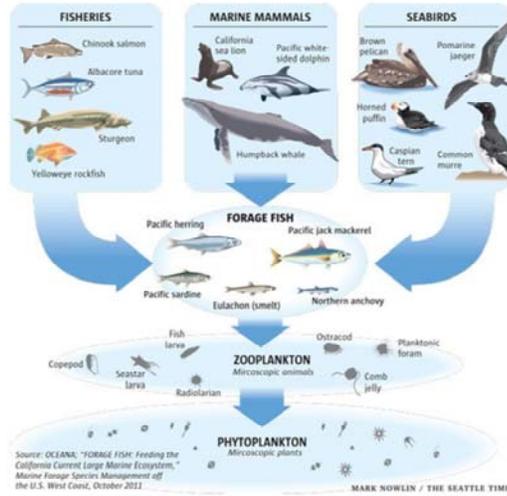
Harmful Algal Bloom Resources on NWFSC Webpage

<https://www.nwfsc.noaa.gov/education/foreducators/curricula.cfm>

Protecting Marine Species and Habitats

The ocean food web

Along the U.S. West Coast, most major fish, mammal and seabird species rely on forage fish for food – a group of about 30 species of small schooling fish. Scientists increasingly recognize that maintaining this small group of fish is key to ocean health.



NOAA Species

- \$ Salmon
- Steelhead
- Rockfish
- Green Sturgeon
- Eulachon
- Southern Resident Killer Whales
- Large Whales
- White abalone
- Sea turtles

- \$ Groundfish
- \$ Highly Migratory Species (tuna)
- \$ Shellfish

- Aquaculture



large-scale estuary restoration to assist salmon and wildlife recovery provides an example of adaptation to climate change and sea level rise.

Education Resources

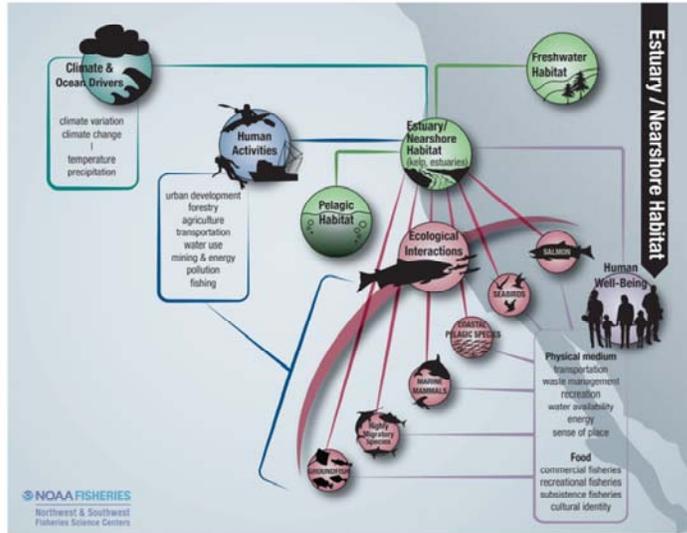
CAREERS



Careers in science, service, and stewardship!



ECOSYSTEM CONNECTIONS



Ocean Acidification Resources

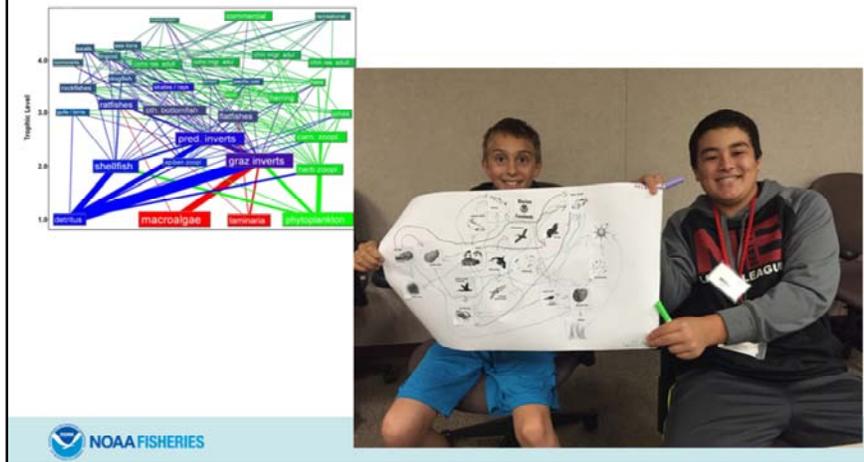
- **Video- High Hopes (5:36)** Created by Ocean Conservancy features NOAA's work on OA impacts on Dungeness crab
- **OA and Dungeness Crab Communications Tool Kit**
- **Video- Ocean Acidification: Salmon in the Puget Sound (6:04)**
Developed with UW to add environmental and climate science to the Since Time Immemorial (STI) Tribal Sovereignty Curriculum in WA state
- **Washington Ocean Acidification Curriculum Collection**
<http://oacurriculumcollection.org/>
- **SOARCE Webinars (Sharing OA Resources for Communicators & Educators)** oceanacidification.noaa.gov



Students work in pairs or threes to construct food chains, build to food webs, and then add additional knowledge and vocab.

Teamwork, discussion, gallery walk or sharing what they did differently, how they thought about it.

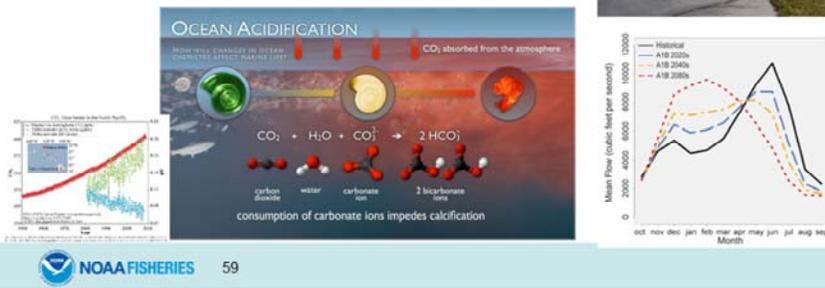
Building Models & Exploring Ecosystem Interactions



Use their model to think about and answer some questions. Similar to how scientists would use food web models. Harbor seals have been increasing in number since the 70's and the Marine Mammal Protection Act. How does this impact steelhead? Other organisms? How do changes in zooplankton abundance influence the survival of juvenile steelhead?

CLIMATE & COMMUNITY RESILIENCE

- Sea Level Rise & Coastal Flooding [SLR Viewer](#)
- Increasing Carbon & Ocean Acidification
- Shifting precipitation patterns
- [National Climate Assessment](#)



Visualizing Climate Change in Your Community- WA Sea Grant

Extreme high tides, or “King Tides”, occur at a few specific times during the year when the moon is closest to earth. During these high water events, we can see what the average water levels might look like in the future, given projected Sea Level Rise. The Witness King Tides project invites people to visit the shoreline and capture images of important places threatened by sea level rise.

King Tides images help local communities and decision makers understand the challenges we will face given a changing climate. Ecosystems, infrastructure and people will be impacted by this phenomenon. In some places the impacts are hard to fathom... Seeing is believing.

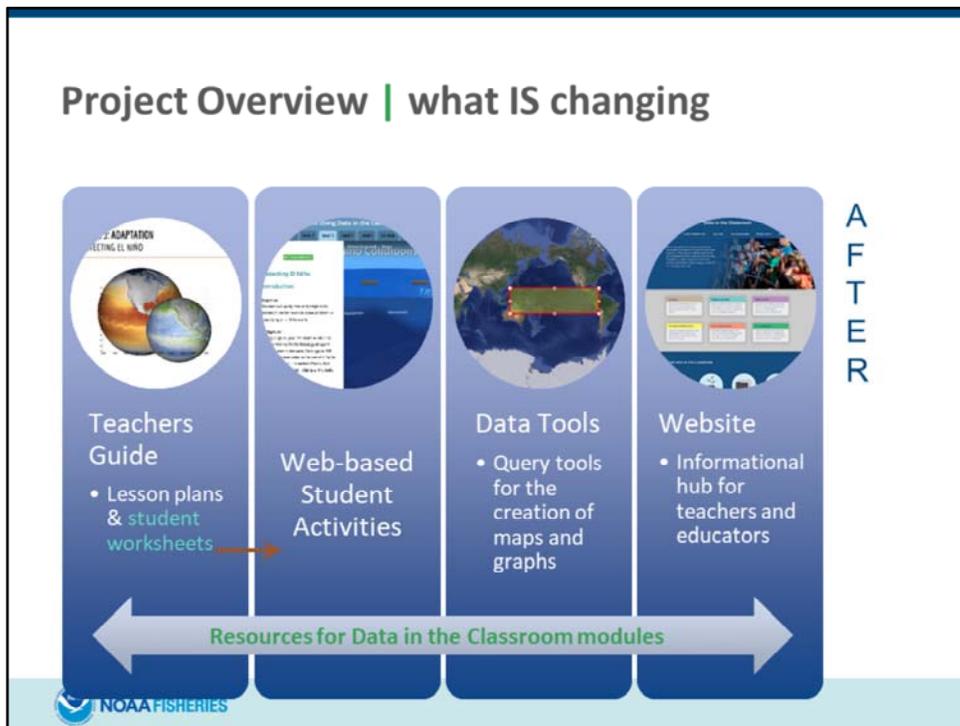
A King Tide is a non-scientific term people often use to describe exceptionally high tides. Tides are long-period waves that roll around the planet as the ocean is "pulled" back and forth by the gravitational pull of the moon and the sun as these bodies interact with the Earth in their monthly and yearly orbits. Higher than normal tides typically occur during a new or full moon.

Changes in the timing of streamflow reduce water supplies for competing demands. Sea level rise, erosion, inundation, risks to infrastructure, and increasing ocean acidity pose major threats. Increasing wildfire, insect outbreaks, and tree diseases are causing

widespread tree die-off.

Climate change: As the Earth's climate warms, sea levels are rising, having a significant impact on coastal populations, economies, and natural resources. Coastal zone management can help coastal communities prepare for and adapt to a changing climate. NOS is creating sea level rise inundation models and supporting the development of climate change adaptation plans, regulations, and policies at the state and local levels.

Mixed rain-snow watersheds, such as the Yakima River basin, an important agricultural area in eastern Washington, will see increased winter flows, earlier spring peak flows, and decreased summer flows in a warming climate, causing widespread impacts. Natural surface water availability during the already dry late summer period is projected to decrease across most of the Northwest.⁷ Projections are based on the A1B emissions scenario, which assumes continued increases in emissions through mid century and rising summer temperatures and changing water flows threaten salmon and other fish species.

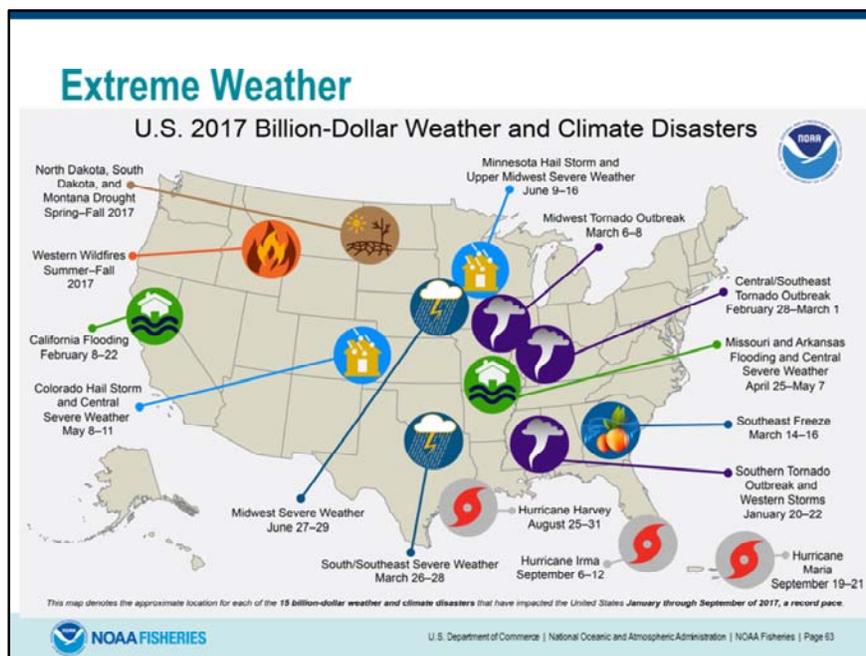


L1 and L2: teachers can use paper and pencil worksheets in place of online activities, if desired

L3-L5: worksheets support the online activities, helping to walk students through their data investigations.



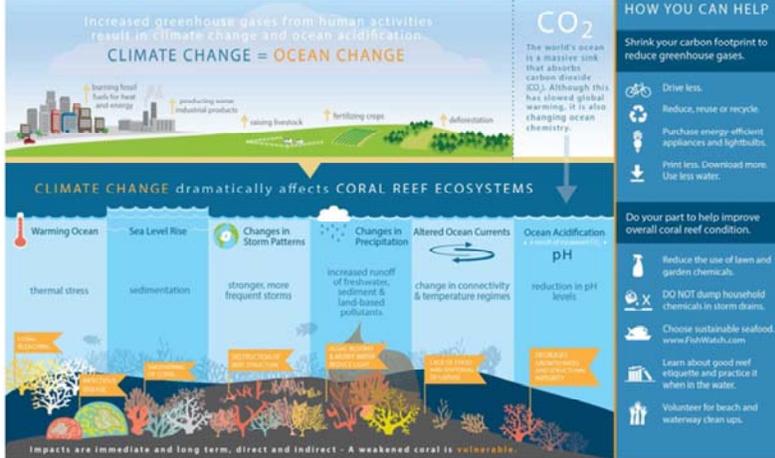
Shifts in local weather patterns could cause longer and more intense droughts, flooding, and wildfires.



In Pacific Northwest, more extreme heat events (not prepared for it), more heavy rain (and flooding) events, increased risk of drought, increased fire risks

Climate Change is a threat multiplier- exaggerates things that already happen (bigger, stronger, longer lasting, more frequent)

THREATS TO CORAL REEFS CLIMATE CHANGE

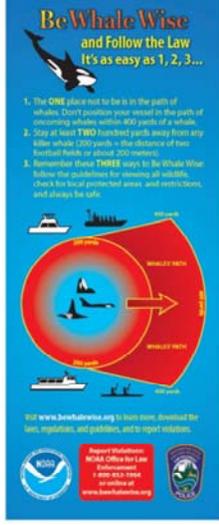


<https://oceanservice.noaa.gov/infographics/>

KILLER WHALES







Research to Support Killer Whale Recovery



Noise & Disturbance

- Behavioral studies
- Acoustic studies
- Habitat use
- Energetic costs

Prey Availability

- Harvest
- Habitat
- Fisheries
- Contaminants

Demographics

- Social structure
- Mating patterns
- Effective size
- Taxonomy

Pollution & Contaminants

- Levels & sources
- Individual & pod variations

Human Interactions

- Whale watching industry studies

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Endangered Southern Resident Killer Whales in the Salish Sea
 Connections to Salmon
 Threats to Survival

Resources

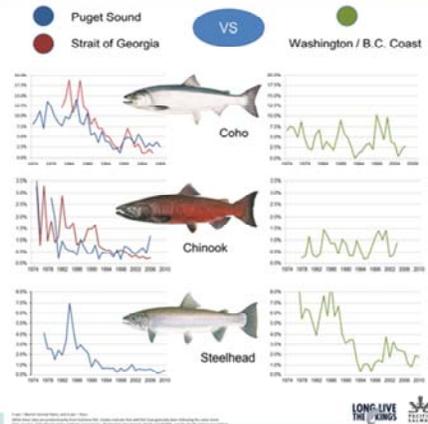
- [Fin Matching activity](#)
- [Killer Whale ecotype poster](#)
- [Mike](#)
- [Killer Whale Trail](#)
- [Whale Museum's whale profiles](#)

SALMON



INTERNATIONAL
YEAR OF THE SALMON

Decline of Salmon and Steelhead Marine Survival in the Salish Sea



Stormwater and Salmon

A MURAL FOR SALMON AND WATER QUALITY
 Estelita Camacho Steffensen
 camachosteffensen@gmail.com
 www.salmonandwaterquality.org
 http://www.noaa.gov/fisheries/water_quality.html

... and the pollution you don't see

Photo by Blake Fazio & Slide by Matt Scholz, NOAA Fisheries

Video of stormwater science,

Resources

- [Mural](#)
- [Poster](#)

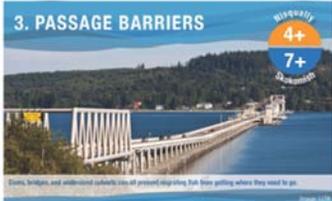


- **Time of year or month held:** 2 weeks in May
- **Audience:** Internet Users, K-12 teachers and students, Business/Tech Community
- **Location:** Online game
- **Purpose:** Create a fun way to allow anyone to learn about ESA listed juvenile steelhead and the threats they face while migrating through Puget Sound.

“Teachers who redeemed their coupon reported serving 1249 classrooms” – These self-reported stats are likely inflated, but our goal was 200. So in any case, it was a big success.

- Over 300 teams were created – general public and classroom teams combined.
- The program reached 15 different counties
- 55% were 3rd-5th graders
- 1700 general public participants

Salmon/Steelhead Survival Game



3. PASSAGE BARRIERS

Difficulty: 4+ (4-7 years)

7+ (7-12 years)

Dams, bridges, and other structures can all prevent migrating fish from getting where they need to go.



4. CONTAMINANTS (POLLUTION)

Difficulty: 5+ (5-7 years)

4+ (4-5 years)

Contaminants that wash into Puget Sound may be good for humans, but they can get into salmon, and that's not good for them.



- Biggest threats?
- Is this game accurate?
- Natural vs. Human-caused?
- What threats can we minimize?





Survival Card Game

We've adapted a generalized Salmon Game to apply specifically to threats facing steelhead in Puget Sound.

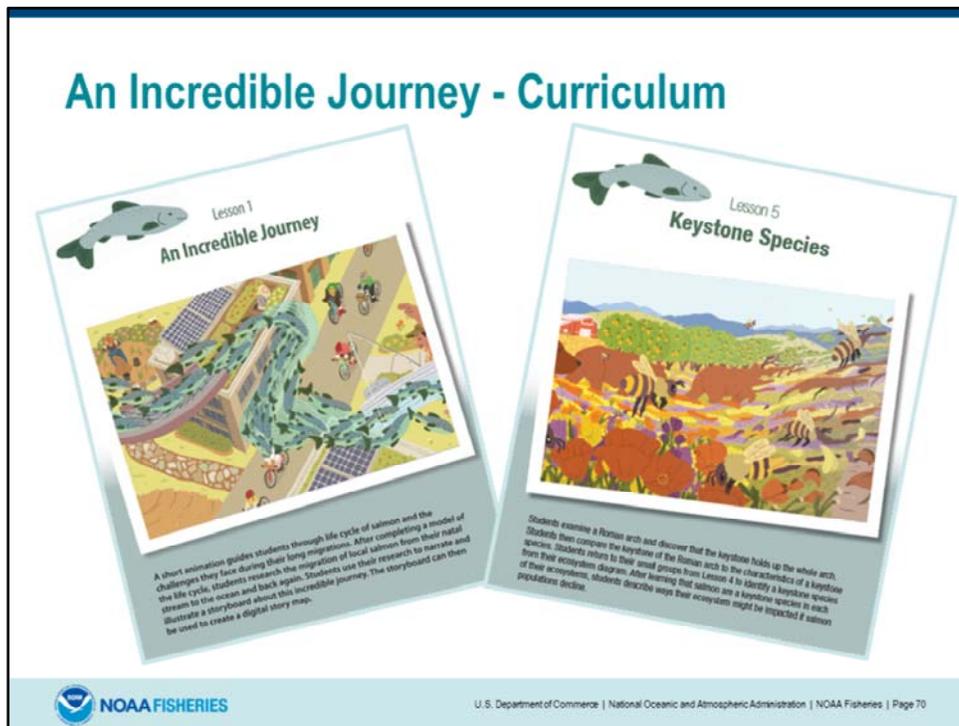
It's a difficult journey. Many won't make it. Get kids thinking about a variety of threats and help them link of to threats they'll see in Survive the Sound.

Pros/cons of a model. How could we make this a better representation of what happens to fish?

Human vs. natural threats?

Which were biggest problems?

Compare the 2 watersheds? Play more times?



International Year of the Salmon intro

The International Year of the Salmon is a collaboration between non governmental organizations, and government agencies to encourage scientists, decision-makers, and the public to work towards solutions that overcome the challenges salmon face and to support conservation and restoration strategies to help manage salmon in the face of climate change. 2019 is the focal year of the International Year of the Salmon with the intention that outreach and research will continue through to 2022.

As part of the effort, we have developed a comprehensive teacher's guide for grades 4-5, children's book, and board game to help people understand the cultural, economic, and environmental importance of salmon.

10 Lessons, covering:

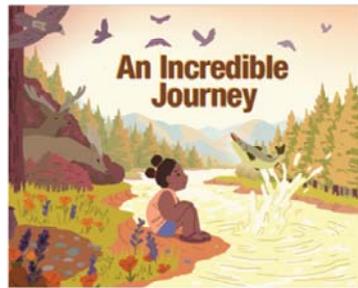
- Salmon migration
- Salmon navigation
- Watersheds
- Ecosystems
- Keystone species
- Global salmon culture
- Sustainable seafood

- Challenges facing salmon
- Stewardship
- Taking action

Each lesson includes:

- Action projects
- Additional resources
- Extensions for art, music, math, engineering, etc.

An Incredible Journey - Children's Book



Major Themes

- Salmon migration
- Salmon as keystone species
- Salmon as a cultural resource
- Population decline
- What salmon need to thrive
- Community engagement

Case Studies

- 6 case studies to inspire kids to take action

The book has also been translated into Spanish

Seeds for Salmonids



Oregon Grape Holly

Oregon grape holly is named for its shiny, holly-like leaves. In late spring, clusters of yellow flowers unfurl from the glossy foliage.

This evergreen shrub is an important food source for wildlife. The small yellow flowers supply hummingbirds and bees with much-needed nectar. Bees and small mammals feed on the blue-black berries, which are also used to make jam.

The root systems produce horizontal rhizomes up to 4 ft (1.2 m) long. The rhizomes help stabilize dry soil and slow erosion.

Its bark and roots can be shredded and used to dye basket materials bright yellow.

NOAA Fisheries is dedicated to promoting the sustainability of wild and farmed fisheries resources through scientific research, habitat management, and outreach and education. Our Seeds for Salmonids program aims to enhance and restore the watershed and riparian environments for important anadromous fish species.



GOOD HABITAT



NOAA FISHERIES

BAD HABITAT



NOAA FISHERIES






NOAA FISHERIES

U.S. Department of Commerce | National Oceanic and Atmospheric Administration | NOAA Fisheries | Page 73

- Our Seeds for Salmonids program was designed to help people understand the connection between land-based habitat and watershed health and to inspire individuals to take action after leaving outreach events.
- The program offers native seeds that are beneficial in restoring salmonid habitat.
- Informational signs also highlight the important ecological, economic, and cultural benefits of each species.
- Other outreach products include illustrations of healthy and unhealthy salmonid habitat and an activity in which students decide which elements of natural and humanmade ecosystems are beneficial or harmful to salmonid habitat.

Questions?

- Casey.Ralston@noaa.gov
- Alicia.Keefe@noaa.gov (until Nov 30)
 - wcr.education@noaa.gov (after Nov 30)

NOAA in your backyard

Get connected to NOAA guest speakers, field trips, and professional development in your area.



Questions 

Pacific Northwest B-WET FY2019 Federal Funding Opportunity

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National Marine Sanctuaries
National Oceanic and Atmospheric Administration



NATIONAL MARINE
SANCTUARIES
OLYMPIC COAST

<http://olympiccoast.noaa.gov>