

ENGLISH

Become a Curator

By Genevieve Goldstein
Pajaro Valley High School

BECOME A CURATOR

Summary:

Students use the internet to become acquainted with different habitat types and ecosystems in their community. They will research what organisms exist in these areas and find out if and how they are being threatened by natural and human impacts. They will utilize the information they find to make recommendations on how to reduce these negative impacts to the organisms of these habitats.

In groups students prepare a newsletter that highlights their findings and recommendations. Students will then showcase their findings through a classroom museum exhibits. Students become the curators and present these to others. A visit to a local museum of any type is highly recommended so students have a model by which to compare.

Subject Area(s): English

Grade Level(s): 9th Grade

Recommended Reading: Gaia Girls Way of the Water. By Lee Welles. 2007. Chelsea Green Publishing Company.

Note: This lesson can accompany any language arts unit where a teacher can incorporate knowledge of ecosystems for environment awareness, point of view poems, editorial writings, and even sensory language descriptive or short story writings.

Lesson Duration: 5 or 6 class periods

California Content Standards:

Reading Comprehension (Focus on Informational Materials)

2.2 Prepare a bibliography of reference materials for a report using a variety of consumer, workplace, and public documents.

2.3 Generate relevant questions about readings on issues that can be researched.

2.5 Extend ideas presented in primary or secondary sources through original analysis, evaluation, and elaboration.

Writing Strategies

1.1 Establish a controlling impression or coherent thesis that conveys a clear and distinctive perspective on the subject and maintain a consistent tone and focus throughout the piece of writing.

1.5 Synthesize information from multiple sources and identify complexities and discrepancies in the information and the different perspectives found in each medium (e.g., almanacs, microfiche, news sources, in-depth field studies, speeches, journals, technical documents).

1.6 Integrate quotations and citations into a written text while maintaining the flow of ideas.

1.7 Use appropriate conventions for documentation in the text, notes, and bibliographies by adhering to those in style manuals

Written and Oral Language Conventions (Students write and speak with a command of standard English conventions)

1.3 Demonstrate an understanding of proper English usage and control of grammar, paragraph and sentence structure, diction, and syntax.

Listening and Speaking Strategies

1.6 Present and advance a clear thesis statement and choose appropriate types of proof (e.g., statistics, testimony, specific instances) that meet standard tests for evidence, including credibility, validity, and relevance.

1.7 Use props, visual aids, graphs, and electronic media to enhance the appeal and accuracy of presentations.

Assessment: Teacher and peer assessment of student work from handouts (See Equipment and Materials section).

Learning Objectives:

1. Students understand the characteristics of their assigned ecosystem in terms of physical environment and the organisms living there.
2. Students understand how environmental/ecological problems are affecting their ecosystem of focus.
3. Students will gain a deeper understanding of specific environmental/ecological concerns in their ecosystem of focus.
4. Students will develop understandings of about how these problems are identified and what may happen if they are not addressed.

Equipment, Materials, and Resources:

- News articles highlighting each habitat's problems
- Computer lab access for two separate days.
- Butcher paper for newsletter.
- PowerPoint Presentation
- LCD Projector
- Newsletter examples for use on Day 3 as models.
- Cardboard, scissors, and other materials the museum exhibit.
- Handouts

Lesson Narrative/ Procedure:

Day 1: Teacher presents a PowerPoint presentation that highlights the various habitat types that students may explore during the lesson.

- Students are grouped into teams of four and decide which habitat or ecosystem they wish to focus on.
- After they see the PowerPoint, they are given the Tapping Prior Knowledge handout. This will determine what they already know about the dangers to this habitat. The newspaper articles on their chosen habitat is passed out and students are asked to take notes on the problem, what caused it, and what solutions they can think of to improve the problem in the future.
- These notes will be put aside as they will later be used as a featured section of their newsletter.

Day 2: Students use the internet and/or magazines to find pictures of animals and plants that inhabit their chosen habitat or ecosystem. Students also gather information about these organisms and create an outline of interesting facts. These facts as well as the pictures they find will be incorporated into their museum exhibits.

Day 3: Using the internet once again, students will conduct further research regarding the threats to their chosen habitat or ecosystem as evidenced in the news articles from day one. They can use keywords like “ecosystem name” and “threat.” The information they find will be used to fill out the Threatened Organisms handout. Each person in the group should focus on a different threat.

Day 4: In their groups, students begin the development of a newsletter that will focus on problems and solutions regarding their habitat or ecosystem.

- Teacher passes out Newsletter Checklist.
- Each group member is responsible for writing an article for the newsletter using resources they gathered on Day 2. Examples of newsletters can be brought in to serve as models.
- The time spent this class period should be in the examination of these models, the beginning of the draft for their section of the newsletter, and a proofreading of the draft by the teacher.
- The draft should be taken home, printed neatly in pen or typed and then accompanied by a picture for the newsletter.

Day 5 or 6: Students bring in their articles and accompanying pictures for the newsletter and assemble them onto the butcher paper in their groups. Newsletters should be completed on this day.

The rest of the class period should be used to create their museum exhibit. Students work in their groups to decorate a section of the classroom using pictures, illustrations, replica models of organisms, signs, interesting facts and statistics. The exhibit should represent the most important issues facing their habitat type or ecosystem, including problems and solutions.

TAPPING PRIOR KNOWLEDGE

1. What are some of the problems for animals in your chosen habitat?
2. How can we reduce the impact of these problems? Be specific.
3. What has been done up until now to improve these conditions?

THREATENED ORGANISMS

Find one newly threatened organism and research the cause of the problem.

What is the name of the organism?

What type of organism is it?

Find a picture of the organism to include.

When did the population begin to decline?

If extinct, when was it last seen?

Summarize any naturally occurring reason for this decline.

Summarize any reason for the decline that was caused by people.

Find three ways that humans are negatively impacting this environment.

What are people doing?

- 1.
- 2.
- 3.

How is this affecting the environment?

- 1.
- 2.
- 3.

NEWSLETTER CHECKLIST

In your groups, use this checklist to guide your work.

Names: _____

Content:

- Our newsletter includes a main article and supporting articles that address our project work
- Our newsletter cites our sources in the text and describes the problem well
- Our newsletter provides solutions
- We proofread and carefully crafted our writing to make it interesting and relevant to our audience
- Our newsletter highlights special points of interest related to our topic
- Our newsletter includes statistics and states facts that inform our audience about what they can do to minimize harm to this habitat
- We answer the essential question “What can we do to protect this habitat?”
- Our newsletter includes a bibliography

Organization and Appearance:

- We include the necessary newsletter components including eye-catching titles, a table of contents, and images (photos, tables, graphs, illustrations) with captions
- We provide an appropriate balance of graphics and text on each page
- We use spacing and margins to create a pleasing layout
- We use appropriate font sizes, images, colors, boxes, and lines to make each page’s design neat and attractive

HABITAT: WETLANDS

Washing Away the Wetlands

Friday, Feb 16th, 2007

Register Pajaronian

By: Matt Farley

Human activity is leading to serious erosion problems at Elkhorn Slough's tidal marshland, according to a recent study.

As pleasant as the harbor may be, Moss Landing could prove to be the death of tidal marshland within Elkhorn Slough, according to a report released Feb. 9.

The report, an early draft of the Elkhorn Slough Tidal Wetland Project's strategic plan, cites erosion and pollution caused by human activity as the primary factors in the loss of tidal marsh in the slough. According to the report, 1,000 acres of tidal marsh, or about half of all such land in the slough, have been flooded or washed out to sea in the last 70 years.



"The area is undergoing a large-scale physical change," said Barb Peichel, the project's coordinator. "A lot of the native plants are submerged and drowning, just like when you over water your plants."

Construction of Moss Landing Harbor in 1947 marked the most significant change to the slough's hydrology, and therefore its wildlife, Peichel said. Prior to the construction of the harbor, the slough existed as a shallow, quiet-water embayment, according to the National Estuarine Research Reserve System. The new jetty at the harbor mouth allowed water to enter and exit the region much more easily, flooding some plants that previously had been allowed to dry during low tide and exposing others that had formerly been underwater throughout the tidal cycle.

Along with other factors, possibly including river diversion, aggressive diking and groundwater overdraft, the increase in tidal flow created serious erosion of the main channel and bordering mud flats, according to the report. Almost 73,250 cubic yards of sediment per year are exported into the slough and bank erosion rates along the channel range from 1-2 feet, according to the report.

In addition to impacting some 100 species of fish, 135 species of birds and 550 species of invertebrates that live in the slough, the changes affect surrounding land, including private property and public sites, according to the report.

The dangers are not only environmental, Peichel said.

“Something we learned from Hurricane Katrina is that the more wetlands we lose, they aren’t there to reduce flood surges,” she said. “They act as sponges or filters to help deal with episodic big flood events. This is similar to what happened in Louisiana on a much smaller scale.”

In the case of New Orleans, many of the outlying marshes had been altered or removed entirely to make way for development, Peichel said. When levees started breaking during the storm, floodwaters were able to rush through the region largely unchecked by the systems that would naturally contain them. If Elkhorn Slough flooded, a similar effect could occur.

“If nothing changes, our predictions show that there will be more marsh loss and more erosion of habitat,” Peichel said. “The slough eventually won’t be able to function as an estuary and it will fail as a habitat and fish nursery.”

Rather than recommending specific solutions, the report outlines “broad, general ideas” for restoration and conservation strategies, Peichel said. Though more than 100 people from 27 different entities have so far been involved in studying and restoring the slough, no clear list of solutions has emerged.

“The message is that there really is not much marshland left in all of California,” she said. “So there isn’t really a quick fix. We’re going to have to think pretty big to deal with it.”

Watsonville Makes Strong Effort to Restore Ramsay Marshland

By Terri Morgan Sentinel Correspondent

Santa Cruz Sentinel

4/10/2005

WATSONVILLE — The city is spearheading a project to remove tons of old fill dirt and construction debris from a former wetland near Ramsay Park, so water can return to a natural level.

The goal is to reclaim an ecologically-valuable marshland, a boon for wildlife and water quality and part of an ongoing effort to restore the vitality of the Watsonville slough system.

"It's so exciting to see," said Laura Kummerer, who works for Watsonville Wetlands Watch, the nonprofit founded in 1991 to protect and restore the wetlands of the Pajaro Valley.

The city-owned property to be restored consists of about 40 acres of historical slough near Harkins Slough Road. The multipronged project includes plans to excavate a 3- to 4-acre area that was used as a makeshift dump in the 1960s behind the Watsonville Nature Center at Ramsay Park.

Once the soil is removed to the height of the surrounding water table, the site will be turned into a marshland habitat. City crews will plant native vegetation in the site and install a temporary drip irrigation system to help the plants.

"We're designing the restoration to provide habitat for native wildlife," said Steve Palmisano, the city's environmental manager.

Design work is more than halfway completed, Palmisano said in March. Funding has been partially secured through \$300,000 in state grants, and field work is expected to begin this summer. City funds and other grants are expected to cover the remaining \$300,000 that will be needed.

"It looks like the city of Watsonville has taken a turn to bring wetlands back to health," said Kummerer.

The 800-acre slough system is actually a series of six sloughs tucked between farmland, roadways and business and housing developments. They are collectively referred to as the Watsonville Slough system because Gallighan, Hanson, Struve, Harkins and West Branch Struve Sloughs all drain into Watsonville Slough. The latter, in turn, drains into the Pajaro River about a quarter mile before the river empties into the Monterey Bay near Pajaro Dunes.

While one of the most important components of the slough system, Watsonville Slough is the most degraded. The western portion of the slough is largely confined to drainage ditches that run along West Beach Drive. Those ditches also collect and transport runoff from surrounding roadways and agricultural fields.

In addition to the Watsonville Slough, Kummerer has been working for the past five years to restore 120 acres along Struve Slough within the 320-acre Fish and Game Reserve.

Historically, the area was home to one of the most diverse grasslands in North America. Early settlers introduced European grasses to feed their cattle, and the nonnative plants eventually choked out the native vegetation. Several projects are under way to remove invasive species and plant California native grasses and wildflowers in their place.

"We're trying to tip the balance back to the natives," Kummerer said. "We've planted four acres of islands of native bunch grasses and wildflowers, and we're mowing (the European grasses) three to four times a year to give light for the native bunch grasses and wildflowers to grow."

Kummerer is assisted by a steady stream of volunteers. Work crews from the California Conservation Corp., Community Youth Authority, and the Natural Resources Employment Program regularly provide labor. In addition, the Watsonville Wetlands Watch hosts volunteer work days every second and fourth Saturday of the month.

"The bulk of the work gets done on volunteer days," Kummerer said.

HABITAT: COASTAL WATERS

"Dead Zone" off Oregon Coast Is Growing, Study Says

Cameron Walker
for National Geographic News
August 4, 2006

A "dead zone" of low-oxygen water has been appearing along the Oregon coast each summer since 2002, suffocating crabs and other creatures that can't swim or scuttle away.

This year the zone is stretching longer and thicker than it ever has before, possibly reaching into the waters off Washington State.

"This is the first year we've seen the dead zone expand," said Jane Lubchenco, a marine biologist at Oregon State University in Corvallis.

This year's zone blankets approximately 70 miles (113 kilometers) of the central Oregon coast and may extend another 170 miles (274 kilometers) into Washington waters.



In some spots the zone is 98 feet (30 meters) thick, swallowing nearly half of the water column.

In both states people have reported dead rockfish and other bottom fish on beaches. Fishers have found their crab pots packed with dead crabs.

"These are the biological indicators that we've had that something [unusual] is going on down below, out of sight," said Liam Antrim, a resource protection specialist at the Olympic Coast National Marine Sanctuary in Washington.

Change in the Winds

Development of the dead zone is related to ocean upwelling—a natural process driven by winds.

Along the Oregon coast, upwelling occurs when spring winds consistently push warmer surface water offshore.

Colder, nutrient-laden water rises from the ocean floor to replace the lost mass, and the surge of nutrients provides food for microscopic plants called phytoplankton that live at the surface.

"It's one of the reasons we have such rich fisheries," Lubchenco said. Plankton form the base of the ocean food chain.

HABITAT: COASTAL WATERS

Seabirds Fly Pollutants to Arctic Coast, Study Says

James Owen
for National Geographic News
July 14, 2005

With rising levels of toxins in the Arctic threatening wildlife and humans alike, scientists are on the hunt for what's behind the pollution boom. Wind currents carrying pollutants from industrialized countries are known to be largely responsible for toxins in the Arctic seas. But on the coasts birds are the key culprits, a new study says.

Researchers who studied a large seabird colony in the Canadian Arctic found that ponds below the birds' breeding cliffs are laced with persistent organic pollutants, or POPs.

The birds, it seems, are eating carrion, squid, and other marine animals from POP-contaminated seas. The flyers then return to their coastal home and deposit their contaminated prey—in the form of excrement—in local ponds, which see their POP levels skyrocket as a result.

Experts say the study adds to concerns over the impact of toxic substances on the health of the Arctic's wildlife and people.

"What's unique about this study is that it identifies a new method of bio-transmission that's potentially causing contamination to the local environment," said Russel Shearer. Shearer is the manager of the Canadian government's Northern Contaminants Program, based in Hull, Quebec. The program investigates the risks and impacts of chemical pollutants to remote communities in northern Canada. "Such contamination should be taken more seriously," Shearer added.

The researchers' findings are based on observations of a colony of more than 20,000 northern fulmars at Cape Vera on Devon Island in the Canadian province of Nunavut. The study will be reported tomorrow in the journal *Science*.

"This mode of chemical movement can lead to surprisingly high levels of contaminants, because the contaminants are first accumulated in the food chain and then funneled into relatively small areas where the birds nest," said the study's lead author, Jules M. Blais. Blais is a biogeochemistry professor at the University of Ottawa, Ontario. Northern fulmars are a keystone Arctic species, providing vital nutrients to an otherwise desolate landscape.

"We have a unique ecological situation, where birds that feed over the ocean are nourishing an entire ecosystem under their cliffs," Blais said. "If the seabird colony left, mosses, lichen, insects, and small birds like snow buntings—and even small carnivores like foxes and jaegers [a type of large bird]—would probably be displaced or disappear altogether."

But the "biological pump" provided by seabirds is now also transporting industrially produced contaminants.

HABITAT: BEACHES AND DUNES

Oceans Awash With Microscopic Plastic, Scientists Say

James Owen
for National Geographic News
May 6, 2004

Beaches worldwide bear witness to the ugly impact of plastic debris on our oceans. Milk jugs, water bottles, cigarette lighters, diaper liners, jar lids, cheap toys, and goodness knows what else festoon tide lines today. But this may just scratch the surface.

A new study suggests that microscopic bits of plastic have sifted, unseen, throughout the marine environment. The plastic not only litters the beach, it is—like fine bits of sand—becoming the beach.

U.K. researchers in Plymouth and Southampton, England, found that microscopic fragments of nylon, polyester, and seven other types of plastic are widespread in sediments around British shores.

The sediments were collected from beaches, estuaries, and shallow waters. "Everything that didn't look like a piece of natural organic debris was then identified," said Richard Thompson, a senior marine ecology lecturer at the University of Plymouth, who led the study. Up to a third of this material was later identified as synthetic polymers used in plastics.

Even so, the scientists write in the research journal *Science*: "We believe that these [fragments] probably represent only a small proportion of the microscopic plastic in the environment."

Thompson says the amount is probably greater, but they currently lack the technology to accurately distinguish plastic debris less than 20 microns in diameter (a width thinner than a human hair).

Beyond plastic-enriched shorelines, the team found that plastic particles are now common in the high seas.

To gauge long-term trends, the scientists examined plankton samples collected over the past 40 years in shipping lanes between Iceland and Scotland. Results showed there was approximately three times more plastic in the water column in the 1990s compared with the 1960s.

"Estimates for the longevity of plastic range from a hundred to a thousand years," Thompson said. "Since we've only been [mass producing] plastics for 40 years, we still don't have a full handle on their longevity."

The impact of larger plastic flotsam on marine wildlife is well documented. According to the U.K.'s Marine Conservation Society, a national environmental nonprofit, more than a million seabirds and 100,000 mammals and sea turtles die globally each year from entanglement in, or ingestion of, plastics.

MUSEUM FIELD TRIP ACTIVITIES

Activity Choice 1

Dissect an Exhibit. Students analyze an exhibit in terms of 3 essential questions. Groups of 2 recommended followed by structured small group (4-6) discussion.

1. What are 5 characteristics about this exhibit that make it a “good exhibit?”
2. What are 3-5 kinds of jobs or skills that are required to make this exhibit successful?
3. What is the main message of this exhibit?

Activity Choice 2

Scavenger Hunt Model. Students complete the graphic organizer below for any exhibit they view. They must find information provided by the exhibit and docents working alongside the classes. Add more organisms if you want, try to make it open ended. Groups of 2 recommended.

Organism	Conservation Concerns/Issues	What can we do about it? What are others doing? (Action)

Activity Choice 3

Ecosystems as Integration. Students analyze the interdependence of ecosystems as a model of integration by answering some essential questions about an exhibit and extending their questioning in small group discussions.

1. How do the organisms (plants, animals, algae, bacteria) depend on each other in this exhibit? How do they depend on each other in their natural habitats?
2. How do humans depend on organisms like the ones in this exhibit? Why do humans depend on healthy ecosystems?
3. What is the human impact upon the **interdependence** of organisms in ecosystems?

IP ASSESSMENT ORGANIZER

Item	Topic/Activity	Evidence Of Completion	Pass/Not Pass
1	Research, collect, organize pictures of ecosystem scenery		
2	Research, collect, organize pictures of ecosystem organisms		
3	Find an endangered organism. Research cause of endangerment. Find a newly threatened organism & research cause		
4	Research 3 ways humans are negatively impacting this ecosystem		
5	Research 2 ways our health is affected by negative human impacts on this ecosystem		
6	Collect facts on progress over time & summarize information. Make predictions about this.		

STUDENT EXHIBIT EVALUATION (Please evaluate and rate each group project on a scale from 1-4 according to the following guide)

Score	4	3	2	1
Content and Understanding	<p>a) Describes the problem and recommendations <u>completely</u> in an organized fashion</p> <p>b) Displays <u>in depth</u> knowledge of the ecosystem</p>	<p>a) Describes the problem and recommendations <u>in a general way</u> and in an organized fashion</p> <p>b) Displays a <u>general</u> knowledge of ecosystem</p>	<p>a) Describes the problem and recommendations in a <u>general way</u> with <u>some gaps</u> and <u>lacks organization</u></p> <p>b) Displays <u>some</u> knowledge of ecosystem</p>	<p>a) <u>Does not describe</u> the problem and recommendations well and <u>lacks organization</u></p> <p>b) Displays <u>minimal</u> knowledge of ecosystem or habitat</p>
Presentation	<p>a) Presents the information with knowledge & expertise</p> <p>b) Develops effective & appropriate visual view of data</p> <p>c) Presents in a manner that is extremely clear, focused, well suited</p> <p>d) Includes main idea that significantly draws the audience's attention & is supported by strong support details</p>	<p>a) Presents the information with knowledge</p> <p>b) Develops appropriate visual view of data</p> <p>c) Presents in a manner that is generally clear, focused, well suited</p> <p>d) Includes main ideas that draw audience's attention & developed by clear supporting details</p>	<p>a) Presents the information with basic knowledge</p> <p>b) Develops visual view of data</p> <p>c) Present in a manner that is somewhat unclear, needs focus, or could be better suited</p> <p>d) Includes main ideas that are not clearly developed by ideas & is developed by clear supporting details</p>	<p>a) Does not present the information with much knowledge</p> <p>b) Develops an incomplete visual view of data</p> <p>c) Presents in a manner that is unclear</p> <p>d) Includes main ideas that are not developed & is missing supporting details</p>
Organization and Mechanics	<p>a) Organizes presentation in a way that strongly enhances & develops main ideas</p> <p>b) Presents information in order, using strong structure & supports audience's understanding</p> <p>c) Details are carefully selected & strategically placed for optimal audience engagement</p> <p>d) No errors</p>	<p>a) Organizes presentation in a way that consistently enhances & develops main ideas</p> <p>b) Presents information in order, using structure & supports audience's understanding</p> <p>c) Details are placed for good effect and audience engagement</p> <p>d) One or two errors but don't detract from presentation</p>	<p>a) Organizes presentation in a way that enhances main ideas</p> <p>b) Presents some of the information out of order or doesn't encourage audience involvement</p> <p>c) Some details are missing, or misplaced creating a somewhat ineffective impact</p> <p>d) Includes some errors that detract from presentation at times</p>	<p>a) Organizes presentation in a way that doesn't enhance main ideas</p> <p>b) Presents information out of order & is difficult to understand</p> <p>c) Many details are lacking, creating an ineffective impact</p> <p>d) Includes many errors that make presentation difficult to understand</p>

STUDENT EXHIBIT EVALUATION

Please score each exhibit using the rubric on the previous page			
Exhibit Name	Content and Understanding (1-4)	Presentation (1-4)	Organization and Mechanics (1-4)

Evaluated by: _____