Marine Reserves

Lesson Objectives: Students will be able to do the following:

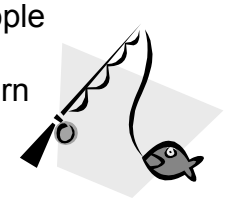
- Describe the advantages of a marine reserve as a management tool
- Differentiate between a consensus process and a majority rule process
- Name and describe three types of technology used to monitor reserves

Key concepts: conservation, fishery management, geographic information systems, stakeholders, consensus

Marine Reserves as Management Tools

Marine reserves are among the management tools being considered in the Channel Islands National Marine Sanctuary. Marine reserves are "no-take" zones where all removal of resources (such as fishing) is prohibited. People are allowed to use marine reserves for recreational purposes such as wildlife viewing, photography, and diving.

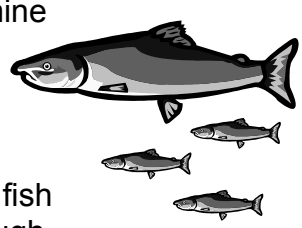
Marine reserves are being considered as a management tool for several reasons. The number of people living near our coasts is growing. Currently more than fifty percent of our population lives within fifty miles of the coastline. Many people use the oceans for recreation. Some people make their living by fishing. As people learn more about the ocean, and technology improves, fishing becomes much more efficient. Increased fishing efficiency can lead to the rapid depletion of mature (reproducing) members of a **species**. As cities grow, pollution from industry may increase. Polluted water from industrial or agricultural sites may enter the ocean. In addition to human impacts, changes in natural cycles also affect marine systems. Extremes in weather conditions (such as El Nino) can have an impact on marine organisms. Resource managers realize that new strategies need to be developed to protect **biodiversity** and sustain fisheries. These strategies will require careful evaluation of the many factors that influence ocean **ecosystems**. Marine reserves are one way to approach this problem.



Sanctuary managers want to use marine reserves as **conservation** and fishery management tools. Conservation measures protect species and **habitats** of special concern. There are two components to conservation: preservation and enhancement. Preservation issues include protecting the organisms and

habitats in their present condition.

Enhancement strategies try to ensure that the populations of organisms increase to **sustainable** levels. Conservation efforts include collecting scientific information (such as fish counts) to determine the distribution and status of species of concern. Managers use these data to determine the best way to protect the natural resources. Fishery management tools are used to maintain fished populations at sustainable levels. These tools include catch limits (such as size or seasonal restrictions), effort limits (such as gear restrictions), and marine reserves (which limit both effort and catch). Researchers are trying to determine ways to create sustainable fisheries. This means that the fish must have enough reproducing adults to keep their populations from declining.



Creating Marine Reserves

Creating marine reserves is a complex process involving many **stakeholders**. The stakeholders are people with an interest in the Channel Islands National Marine Sanctuary (CINMS). These people include government officials, commercial fishermen, recreational fisherman, divers, whale watch boat operators, industry personnel, environmental groups, and the public at large. These stakeholders must come together to decide where to establish reserve areas. They must also decide how to conserve and manage the reserves.

Once the stakeholders are defined, individuals representing each group are identified. Representatives work together to meet the goals of all the stakeholders and must be sure that they follow government guidelines. The CINMS process has a unique feature. The stakeholders must make decisions through **consensus**. Consensus requires that all members agree on the actions taken. This is different than voting where the majority view is accepted. This consensus process takes a long time to complete as stakeholders justify their viewpoints and agreements are renegotiated. (See activity.)

Stakeholders need to evaluate many issues in the process of establishing marine reserves. To understand the complexity of this process, we will take a closer look at one concern of two of the stakeholder groups: conservationists and fishery managers. One issue these two groups will need to agree upon is the size of the reserve area. Conservationists are interested in

the general protection of habitat and species. They want large areas protected. Large reserves protect more animals and plants. Fishery managers are looking at needs of individual fished **species** and fishermen. It may be possible to conserve a single species by protecting a very small area. The process of establishing marine reserves can only continue when these groups agree. Scientists provide information to both groups so that they can make informed decisions. Scientists develop guidelines for reserve design that will help stakeholders meet their goals. In this case, the science panel determined that no less than 30% of the sanctuary, and possibly 50% of the sanctuary should be set aside as marine reserves for conservation and fisheries.

Technology used in the Marine Reserve Process

Stakeholders use scientific and **economic** information to make decisions about establishing marine reserves. Scientific information describes the living and nonliving parts of the area being considered. These data are collected through a variety of technologies. Divers use video cameras to take pictures of the physical features found within the habitats. Underwater submersibles obtain video information from deeper areas. Acoustic Doppler current profilers measure currents. Side-scan sonar is used to give an overall picture of the habitat terrain (See Spring 1999 packet for more information). Monitoring techniques such as band transects and roving fish counts are used to study the organisms that live within these habitats.

Economists and social scientists collect information about human activities. They describe commercial and recreational use of the sanctuary. They try to determine how many dollars these industries earn from fishing.

Some of the scientific information collected is difficult to understand. It needs to be simplified so everyone can use it. To do this CINMS personnel are using a new computer technology called a Geographic Information System (GIS). GIS translates information from a database into maps. These maps give people a picture of the information. These pictures are easier to understand than numbers. People can also add more information layers to their maps. These maps help stakeholders to analyze the results of their decisions.

By using GIS, resource managers gather information that can be used to make wise decisions to protect and sustain marine habitats and species.

Activity: The Thumbs Have It!

People often work together to make important decisions. Sometimes people vote to decide. The side with the most votes wins. This is called majority rule. Other times people use consensus to make decisions. In consensus, all participants must agree on the outcome before the process can continue. Consensus is sometimes difficult to reach, because people must be most concerned about the overall good instead of their personal interest. To reach consensus takes time and a mature group of people, but it can be done. The rewards are great when consensus can be reached.

Objectives: Students will be able to do the following:
1. Describe the difference between consensus and majority rule.
2. Participate in or demonstrate a consensus activity.

Important Note to Teacher:
Consensus activities are designed for groups that have attained a certain level of cohesiveness. Sometimes groups will have participated in "teambuilding" experiences facilitated by an outside person, or they will have been immersed in situations that draw on mutual respect, trust, and caring through character education programs. Consensus can be difficult to reach even in what at first may seem a simple situation. The process can become frustrating to the members and can quickly turn volatile. If your students have not demonstrated these higher-level skills the activity may done as a demonstration by a few individuals or role-played by a select group. Role-play is a good way to diffuse a situation, because students are merely playing a part. If you choose this option, you may use the role-play at the end of this activity.

Procedure:
1. Have students gather in a circle and discuss ways of making decisions.
2. Tell students that today they are going to take part in (watch or demonstrate) two different kinds of decision-making processes: majority rule and consensus.
3. Discuss what majority rule means and the process for voting. Have students come to a decision by majority rule. Ask students that were not in the majority how they felt about the decision. Ask students in the majority how they felt about the decision. Discuss when it would be appropriate to make decisions based on majority rule.
4. Discuss consensus. Explain that coming to consensus means that everyone must agree. Explain that in this activity hand signals will be used to describe the level of agreement. Show students the following signals.
    - Thumb pointed upward-this means that I can totally agree with the decision
    - Thumb pointed to the side-this means that I can live with the decision
    - Thumb pointed downward-this means that I **cannot** live with the decision

5. Set up the following parameters for the activity:
   - Only one person may speak at a time.
   - Decisions will be made through hand signals.
   - The teacher will state the first proposal.
   - Once the proposal is given, everyone will vote using a show of thumbs. There is no discussion at this time.
   - People with their thumbs down will each be given an opportunity to explain why their thumb is down. They will also need to give an explanation of what will move their thumb at least sideways.
   - After the person explains their objection, a new premise may be brought to the table.
   - The new premise is voted on and the process continues until all thumbs are either up or sideways.

   (As you can see this may take a long time. There may be a stalemate. Try to come up with something to vote on that has only a few options.)
   (Below is a role-play that can be used to demonstrate consensus.)
6. After the activity, discuss with students how well the process worked. Were there areas of difficulty? What did they need to work on as a group before they could come to consensus? How could this process be used in other situations?

Possible Extensions:

1. More cohesive groups could practice coming to consensus without the teacher as a participant.
2. Groups could research the various stakeholders in the marine reserve process. The students could role-play the various stakeholders as they tried to come to consensus.

Consensus Demonstration: It's Time for Lunch!

Choose students to play the parts. Hand out the consensus demonstration sheet to the participants and have them read through areas with their character's name in bold. After they have read their parts, have them form a group. Begin the activity by reading the situation.

Situation: The school administration has given us permission to change the starting time for our lunch period. We will be using consensus to determine if the starting time for lunch should stay the same or if it should be changed.

Teacher: I am going to propose that the starting time for lunch should stay the same. Those that agree will put their thumbs up. Those that don't care will put their thumbs sideways. Those that disagree will put their thumbs down. (After the vote **Derrick** and **Kristina** have their **thumbs down**.) Everyone with their thumbs down will get a chance to tell us why they disagree.

Derrick: I think we should have lunch sooner, because I am really hungry by 12:15.

Kristina: I think we should have lunch later, because I don't eat until 7:00 at night. If we have lunch sooner, then I am really hungry before 7:00.

Teacher: Does anyone have a suggestion that will help solve this problem?

Shaun: I propose that we eat fifteen minutes earlier. That is only a little earlier than we usually eat and then Derrick won't be so hungry. Could we see a show of thumbs on eating fifteen minutes earlier? (The thumb count shows that only **Kristina** still has her **thumb down**.) *(Note: In a real situation if more people disagreed with the second proposal than with the first, then the proposal is removed from the floor and you start from the first proposal.)*

Kristina: That's even worse. Now I'll be even hungrier by 7:00.

Teacher: Does anyone have a suggestion as to how we can solve this problem?

Maya: Could Kristina eat a snack when she got home, so she wouldn't be so hungry?

Kristina: No, my mom won't let me have any snacks.

Lynn: Could Derrick have a morning snack at break, so he wouldn't be too hungry before lunchtime?

Teacher: I suppose we could do that. I would have to check to see if it would be O.K. and the snack would have to be nutritious. So the new proposal is to leave lunch at the same time, and let Derrick eat a snack at break. Let's see a show of thumbs. (**Kristina** still has her **thumb down**.)

Kristina: I still have the same problem as when we started.

Teacher: Any proposals?

Adam: What if we went to lunch fifteen minutes later? Derrick could eat at break and Kristina won't be too hungry before dinner.

Kristina: I guess that would help a little. I could give it a thumb sideways. So the new proposal is that we go to lunch fifteen minutes later. Let's see a show of thumbs.

Students all vote: Everyone has his/her thumb either pointing up or sideways.

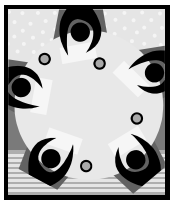
Teacher: We all agree that we will go to lunch fifteen minutes later. Consensus has been reached.

Student Information: Marine Reserves

Marine reserves or “no take” zones are being used to help protect our oceans. Within these areas, natural resources are protected from removal or harvesting. Even fishing within these areas is illegal. People can still enjoy marine reserves. Boating, viewing and photographing wildlife, and diving are allowed in these protected regions.

Many people (**stakeholders**) have an interest in ocean management. Government officials and the majority of the public want to conserve marine life and **habitats**. Environmentalists want areas of the ocean to be preserved for the use of future generations. Fishermen want to be able to use some of the resources to make a living.

Creating marine reserves is a complicated process. Stakeholders gather together to discuss their goals. Panels of experts collect information and provide it to the stakeholders. This information is used to help make important decisions. The stakeholders discuss their concerns. The stakeholders meet until the needs and interests of all representatives are met. Proposals developed by stakeholders must agree with government regulations.



Marine reserves are one of many management tools that can be used to protect our natural resources. The process for creating marine reserves shows us how individuals can work together for the good of all.