

## **Free fish and invertebrate ID classes gets SCUBA divers involved in marine conservation**

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### **Abstract**

In the Georgia Basin Puget Sound, recreational SCUBA divers can help monitor marine fish and invertebrate populations by entering dive sightings into a national database ([www.reef.org](http://www.reef.org)). Participation is a vehicle for citizen stewardship of sub-tidal resources that are not visible to the public at large, and data collected on species distribution and species abundance can help biologists working to recover species in decline or identify invasive species. Previous work suggested that offering free fish and invertebrate identification classes was the best way to increase diver participation. Between May 2005 and October 2006, 261 citizens were trained to identify a suite of common marine fish and invertebrates. Participants were queried to see how many dive surveys they had conducted and to see if they felt that training had increased their capacity for marine conservation. Of the people trained and queried, 14% (n=36) completed an on-line follow-up survey. On average, each participant reported conducting six roving dive surveys since taking the class. Assuming respondents are representative of the group at large class participants have collectively completed 1,611 surveys since talking the course. Additionally 97% of respondents felt the course increased their appreciation for marine creatures and conservation, while 55% responded that the class inspired them to increase their marine conservation efforts in ways additional to conducting roving dive surveys. Judging the merit of marine conservation education efforts can be difficult; however, it appears that offering free fish and invertebrate identification classes increases diver participation in collecting helpful data and increases their capacity for other marine conservation activities.

### **Introduction**

Volunteer-based dive survey data have been beneficial in monitoring marine ecosystems in Hispaniola (Schmitt et al., 2002), the United States (Schmitt and Sullivan, 1996), and Tanzania (Darwall and Dulvy, 1996). A citizen-based volunteer fish and invertebrate monitoring program exists in the Georgia Basin Puget Sound that promotes sub-tidal resource stewardship and helps supplement more rigorous census work being conducted (such as trawling or seining and linear transect surveys). The Reef Environmental Education Foundation's (REEF) Fish Survey Project enables SCUBA divers in the region to monitor fish and invertebrate presence and abundance while diving recreationally (Pattengill-Semmens and Semmens, 2003). During the survey, divers swim freely throughout the dive site (known as the Roving Diver Technique) and record every observed and identifiable fish species and a suite of select invertebrate species. At the conclusion of the survey, divers assign one of four log<sub>10</sub> abundance categories (single [1], few [2-10], many [11-100] and abundant [>100]) to each species observed. Species data, survey site, bottom time, dive depth, water temperature, habitat type surveyed and other environmental information are recorded on data sheets provided by REEF. The surveyor then returns the completed forms to REEF, paying only the cost of return postage. The data are ranked based on diver experience

level (level 1, 2, and 3 are amateur, levels 4 and 5 are considered experts) and entered in to an electronic database, which can be accessed by anyone through the REEF website ([www.reef.org](http://www.reef.org)).

The more data volunteer SCUBA divers collect, the more valuable the REEF database becomes in its capacity to help monitor trends in the region's marine fish and invertebrate populations. Prior work suggested that the offering of free fish and invertebrate identification classes was an ideal way to increase diver participation (Sine and Gaydos, 2005). A year of free fish and invertebrate ID classes were offered in Washington State and participants were queried to determine the effectiveness of the class in increasing the number of dive surveys and increasing participant interest and capacity in marine conservation.

### **Materials and Methods**

Free marine fish and invertebrate identification classes were offered in Seattle (May 2005 and June 2005), Bellingham (October 2005), Port Townsend (January 2006), Olympia (April 2006), Orcas Island (July 2006), and Hood Canal (October 2006). In October 2006, an e-mail was sent to all class participants requesting their participation in an on-line survey and responses were analyzed (Fig. 1).

Figure 1: Electronic Survey Sent to Fish and Invertebrate ID Class Participants

1. **Did you attend a SeaDoc Society sponsored free fish and invertebrate identification class?**  
Yes  
No
2. **If yes, where did you attend**  
Seattle  
Bellingham  
Pt. Townsend  
Olympia  
Orcas Island
3. **How did you hear about the class?**  
Dive shop  
Friend  
Electronic list serve  
Newspaper  
Other (please explain)
4. **Are you a certified SCUBA diver?**  
Yes  
No
5. **How many REEF surveys have you conducted since attending the free fish and invertebrate ID class? Enter the exact number if possible:**  
(you can see your entered reef data at <http://www.reef.org/data/mydata.htm>)
6. **If you haven't completed any REEF surveys, why not?**  
Not applicable  
Not a diver  
Don't like filling out forms  
Just haven't gone diving yet, but am planning to dive and survey  
Other, please explain

7. **If you have completed REEF surveys, have you done fish surveys, invertebrate surveys, or both?**  
Fish  
Invertebrate  
Both
8. **Did the free fish and invertebrate identification course increase your appreciation for marine creatures and conservation?**  
Yes  
No
9. **Have you increased your capacity for marine conservation in any other way than through REEF surveys since taking this class (Please explain – joined Beachwatchers or marine resource committee; donated to a non-profit marine conservation organization, wrote a letter to a politician, other)**  
Yes  
No  
Please explain:
10. **Would you recommend this class to a friend? Why?**  
Yes  
No  
Please explain:
11. **The class you took was free. How much would you have paid to take the class?**  
Nothing  
\$10  
\$25  
\$50
12. **Had you heard about the SeaDoc Society before you took this class?**  
Yes  
No
13. **Had you heard about REEF**  
Yes  
No

## **Results**

A total of 261 people took the free courses (Seattle, n=71 and 32; Bellingham, n=39; Port Townsend, n=24; Olympia, n=49; Orcas Island, n=11; and Hood Canal, n=35). Forty-one percent (n=107) of class participants went on to take the REEF Level 2 test after completing the course. This is a 20 question quiz where participants must identify and list the common name and family of common Pacific NW fish or invertebrates and combined with submitting 2 surveys, fulfills requirements to move from REEF Level 1 to Level 2.

Thirty-six people that had taken the class (14%) completed the electronic survey. Ninety percent of responders were certified SCUBA divers and reported conducting a total of 179 REEF roving dive surveys since taking the class while 24% of responders reported that they just haven't had time to dive yet, but were planning to dive and survey. Ninety-eight percent of responders reported that the course increased their appreciation for marine creatures and conservation, while 56% reported that the course increased their capacity for marine conservation in other ways. Some examples reported include organizing environmental voter contact activities, donating to a marine environmental non-profit organization, joining Beachwatchers, and taking a training program in watershed stewardship. Ninety-five percent responded that they would recommend

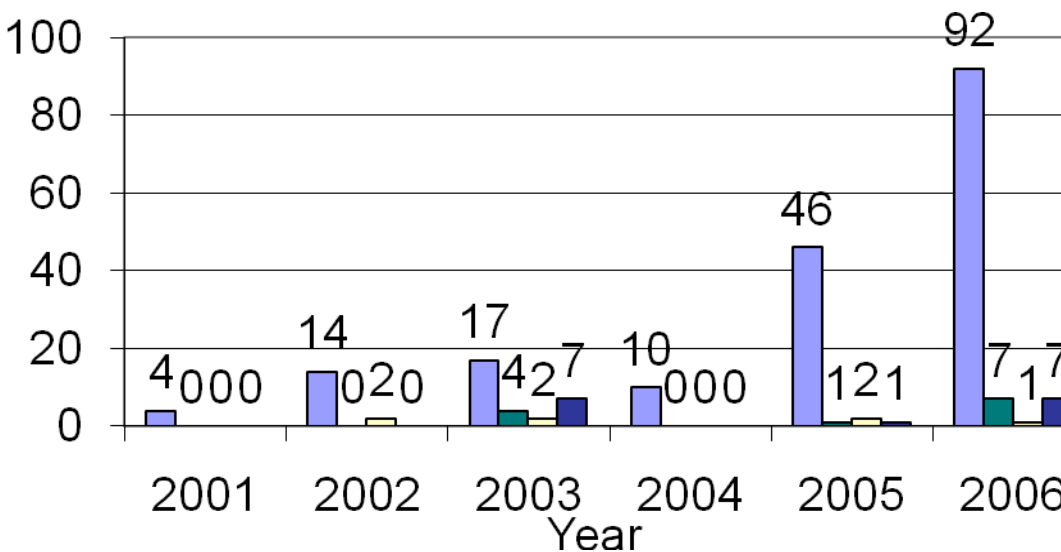
the class to a friend. When asked how much they would have paid for a similar class, 11% said they would have paid \$10, 57% said they would have paid \$25, 19% said they would have paid \$50 and 13% said they wouldn't have taken the class if it was not free.

**Discussion**

The certified SCUBA divers responding to the electronic survey (n=34) reported having completed a total of 179 REEF roving dive surveys for an average of 5.3 surveys per person. If we assume that the survey results are applicable to the entire group of people taking the free classes, we can assume that 90% of the course participants (n=234) were SCUBA divers and that by extrapolation, they would have completed a total of 1,231 REEF roving dive surveys. Even taking into account that some people reported that they had not submitted their survey forms yet, this is probably an over-estimation of the number of surveys that these classes helped produce. Looking at the REEF database, a total of only 1,171 surveys were conducted between May 2005 and October 2006. While this number seems reasonably close to the hypothetical number of surveys completed by course participants, during same time periods for the previous two years, May 2004 - Oct 2005 and May 2003-Oct 2004, 1459 and 1536 surveys were completed respectively. Thus, even though free classes were provided, the numbers of surveys was down for the period in which the classes were offered.

Despite the lack of evidence supporting that these classes dramatically increased the number of surveys being conducted, there are good data supporting that in the near future, these classes are likely to greatly expand the number of surveys being conducted. One of the greatest examples of that is that 2006 saw the greatest increase in the number of trained divers in the Pacific Northwest (REEF levels 2-5), especially level 2 divers, since records have been kept (Fig. 2).

Figure 2: New Experience Levels Achieved by Year  
(REEF levels 2, 3, 4 and 5 by year left to right)



Additionally, the fact that 98% of responders reported that the course increased their appreciation for marine creatures and conservation, while 56% reported that the course increased their capacity for marine conservation in other ways is a very encouraging sign that these classes ultimately will benefit marine conservation and stewardship of sub-tidal marine resources. The health of the Georgia Basin Puget Sound marine ecosystem and its fish wildlife populations are in trouble (Brown and Gaydos, 2005) and the public at large has not yet been convinced. In fact, a study commissioned by Governor Christine Gregoire's Puget Sound Partnership (see [www.pugetsoundpartnership.org](http://www.pugetsoundpartnership.org)), found that in Washington State's Puget Sound region, transportation-related issues are the leading concerns among the region's residents. Only 8% of people questioned even mentioned the environment when asked what they were concerned about. When asked directly what they thought was the leading environmental issue facing the region, nobody even mentioned Puget Sound. Increasing the public's appreciation of marine creatures and capacity for marine conservation is a critical component of restoring the health of the Georgia Basin Puget Sound marine ecosystem.

The seven free fish and invertebrate identification courses given between May 2005 and October 2006 trained 261 people to identify a suite of common fish and invertebrates. This follow-up survey suggests that many of these people are already conducting roving dive surveys and that due to the great increase in the number of REEF level 2 surveyors produced, it is likely that these classes will continue to increase the number of roving dive surveys conducted in the region. The follow up survey results show that these classes also increased participant appreciation for marine creatures and conservation as well as increased their capacity for marine conservation in other ways. Offering free fish and invertebrate identification classes is a demonstrated method for promoting sub-tidal resource stewardship and increasing private citizen appreciation for our threatened marine fish and invertebrate populations.

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