National Fish and Wildlife Grants to the Fishermen's Marketing Association

February 13, 2013

The Fishermen's Marketing Association (FMA) received two grants from the National Fish and Wildlife Foundation to address and explore issues related to the placement of video cameras on commercial fishing boats.

The first grant was awarded to the FMA in 2011. This grant placed cameras on trawlers located in Astoria, Brookings, and Eureka. The purpose of this project was to obtain video images to determine whether the images could capture the same information that an observer would record, with special emphasis on the identification of the species of fish which could be discarded. The field work for this project ended in 2012 and the final report is due in March 2013.

It became obvious early on that with the new IFQ program and having an observer on board the vessel, any behavior involving discarding that may have occurred in the past was not going to be occurring at the same level. However, the camera clearly captured the observer going about his or her business and discarding fish that were not be retained, once they had been sampled.

To record images of fish which could be discarded, there was a dedicated camera with the fish placed upon a white mat with a grid marked with 10 cm squares. Lighting was issue, but not as expected. Video cameras automatically adjust to bright light by reducing the aperture in the lens. The result was to cause the image of the fish to darken, making visual identification difficult.

At the completion of the field work a "test video" was prepared using a selection of video images collected. The test video was prepared in five formats (avi, wmv, mpg, mov, and asf). Volunteers to take the test were solicited from NMFS, the three States, fishermen, and one observer company. In total 20 individuals volunteered to take the test. Some of these people were currently port samplers, some had worked on groundfish in the past, and some were more involved in management and had not had field exposure in many years. The results of the test varied greatly. Perhaps some people should not have taken the test. Observers and current port samplers did much better than others.

Correct answers ranged from 49% to 89% for all species, and from 48% to 93% when only including FMP species. The percentage correct increased dramatically when evaluated at the genius and at the family level.

One problem related to the issue of lighting was that several of the images were very dark. Nearly every person taking the test commented on the darkness of some of the

images. It was learned that the lightness/darkness quality is also influence by which file format is being viewed and which media player is being used to view the video. These are two issues which were not anticipated going into the testing.

The second grant was awarded to the FMA in 2012. The goal of this second project is to develop image recognition software that will scan video images from cameras installed on commercial fishing boats. There are two tasks in this project – the first is to develop software to identify discard behavior occurring on the back deck of the fishing boats; the second task is to identify species of fish that could be discarded as they pass below a dedicated camera focused on a discard table, chute, or deck mat.

The image recognition software is being developed by Dr. Sinisa Todorovic and one graduate student at Oregon State University in Corvallis, OR.

The software will be tested and the results made available to the National Marine Fisheries Service, law enforcement, fishery managers, and the fishing industry. This project has great potential to significantly reduce the cost to fishermen of placing on-board observers on fishing vessels.

Going into this project, it was believed that detection of discard activity would be the simpler of the two tasks and that species identification would be the more difficult.

Preliminary results show that this assumption is not true. Identifying discard behavior on the back deck is the more difficult task. First with the IFQ program and the presence of observers onboard, discarding is a rare event, so the amount of discard information in the videos is small. Second the motion involved in discarding a fish over board is in many cases the same motion which would be used to sort fish into bins or baskets. Therefore the work has to focus on pixel disruption at the plane near the rail of the boat. This results in many false positive “hits”. This could be caused by a bird or a splash. But at the same time, true positive hits are also being captured.

Species identification is progressing well and an effort is underway to increase the number of species which have been collected.

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