

Tohoku Ecosystem-Associated Marine Sciences: TEAMS

1 Studies on the processes of ecosystem change around coastal fishery grounds

The Tohoku University group surveys the physical, chemical and biological environments around the southern Sanriku coastal area. These surveys note changes in the marine ecosystems for fisheries and aquaculture in the region.

- Environmental monitoring in coastal areas
- Ecosystems and genetic research to restore and conserve coastal areas for fisheries
- Research on the coastal fishing resources and the tidal flat fauna
- Research on the aquaculture environment in coastal areas
- Research on the coastal environment and marine resources in the southern part of Iwate Prefecture
- Outreach Activities

Research activities in Tohoku University group

Joint Council for the Restoration of the Fishing Industry in Miyagi Prefecture

Tohoku University

Miyagi Prefecture

Tohoku National Fisheries Research Institute

Tohoku University established "Joint Council for the Restoration of the Fishing Industry in Miyagi Prefecture" with Miyagi Prefecture and Tohoku National Fisheries Research Institute to contribute to the reconstruction of fisheries by resolving research overlap and uninvestigated areas and by launching a real-time monitoring system.

IWATE

MIYAGI

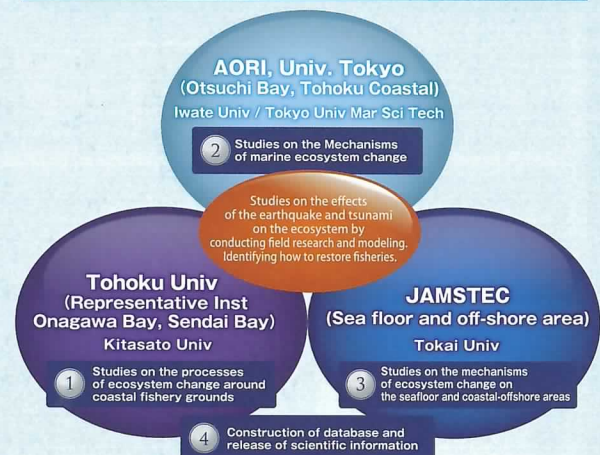


About TEAMS

The Great East Japan Earthquake on March 11, 2011 caused tremendous damage to the ecosystem of the Tohoku area's Pacific coast. For the recovery of the fishing industry in this maritime region, it is important to employ scientific survey methods to precisely comprehend the impact of this catastrophe on the marine ecosystem and the mechanisms by which marine resources recover. However, oil leakage and wreckage from the tsunami, damage to the harbors and seawalls, and the sinking of the land in these areas have change the ecosystems of the coastal areas, so restoring the old production systems would not really help recover the fisheries industry. Instead, we need to first scientifically understand the extent of the damage to the marine environment and ecosystem in the areas, and then come up with progressive methods of restoring the fishing industry with what fishermen experiences and what we have learned about the situation.

Tohoku Ecosystem-Associated Marine Sciences (TEAMS) works with three main institutions to pull together the wisdom of marine scientists from all over Japan, gain scientific knowledge through surveys of marine ecosystems, and to restore the fisheries industry in these coastal regions, in turn helping all of Japan, by working together with local governments, fishermen and citizens.

TEAMS Organization Chart



Official Website <http://www.i-teams.jp/e/>

Research Topics

Tohoku University has been investigating the coastal areas from the southern Sanriku area to Sendai Bay, based out of the Onagawa Field Center and Sendai Station. We research characteristic ecosystems in coastal areas, sandy shores, seaweed beds and tidelands and how they affect the process of revitalizing fisheries resources in the Tohoku area. Understanding what the people in the area need, we contribute to the reconstruction of the Tohoku maritime area by providing useful data and research results.

1: Environmental monitoring in coastal areas of Miyagi Prefecture

To assess the impact of the earthquake and tsunami on the coastal areas of Miyagi, we use research vessels and buoys to continuously collect physical, chemical and biological data on water and sediment quality, water temperature, salinity, dissolved oxygen and the abundance of and species composition of plankton.



Research vessel "Sui-Kou" deployed in Onagawa Bay



Buoy for real time survey

3: Research on the coastal fishing resources and the tidal flat fauna in Miyagi Prefecture

We monitor the fishing resources (fish and bivalves), benthos, plankton, and fauna in the coastal shallow sea areas and tidal flats in Miyagi Prefecture in order to learn the status and recovering process of the coastal ecosystem.



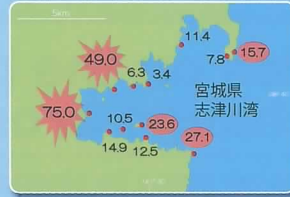
Investigation sites in Onagawa Bay



Otolith of surf fish captured in Onagawa Bay

2: Ecosystems and genetic research to conserve and restore coastal areas for fisheries in Miyagi Prefecture

To conserve the coastal ecosystem, we have been monitoring the dynamics and recovery processes of seaweed bed communities such as the kelp "Arame" (*Eisenia bicyclis*) bed and the animals there. Furthermore, we survey the genetic diversity of benthic invertebrates and demersal fishes.



More damaged Arame in closed-off section of bay [June and July, 2011]



SCUBA survey



Damaged Arame

4: Aquaculture environment in the coastal waters of Miyagi Prefecture and innovation of aquaculture systems

We investigate the efficient production of sea creatures such as oysters, clams, and scallops, and the conditions of the cultures' growth, aiming to rebuild cultivation systems for such resources. We also survey the harm caused by chemical materials and the degree that pollution from the 2011 disaster has had an impact on such cultures.



Production of oysters



Measuring the growth of oysters

Activities and Achievements

Providing real-time information



Real-time monitoring information about coastal environments
<http://www.agri.tohoku.ac.jp/teams/monitoring.html>

Cell phone website

Onagawa Bay



Shizugawa Bay

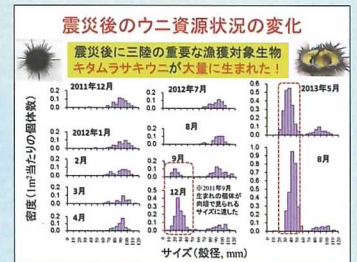
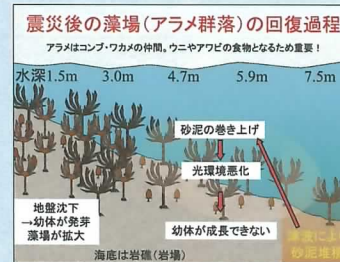


Nagatsura-ura



Ecosystem around the rocky shore in Shizugawa Bay

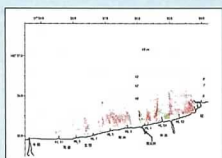
- The 2011 tsunami damaged over 70% of Arame that form the seaweed bed in the closed-off section of the bay.
- The kelp bed has expanded and there are kelp sprouts on the shore where they had never grown before, due to the ground sinking after the 2011 disaster.
- Mud banks damaged the deep area of kelp beds and caused high death rates in kelp because of the lack of light.
- A large number of sea urchins were born in the fall of 2011 and they started to invade the kelp bed in the fall of 2013.



A new method of surf clam dredge fishery in Yamamoto town, Miyagi

We proposed a new surf clam fishing method in the areas where rubble was left behind by the tsunami.

- Using a detailed rubble distribution map, we determined a dredge line, avoiding rubble, and use nets along the line while checking the location with GPS.
- A water jet dredge is a way of fishing shellfish by using a special nozzle to shoot seawater into the sea bed to dig up the shellfish. What is good about it is that you can set the seine line short in areas where there is a lot of rubble, and since its fishing efficiency is so good, even when though the seine line is short, you can still catch a decent amount of shellfish.



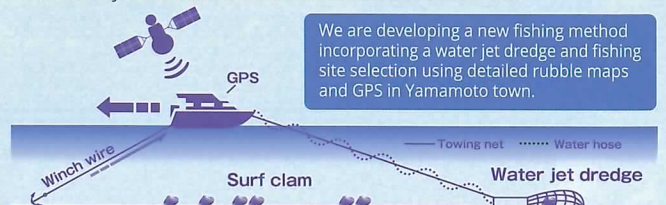
Rubble distribution map (as of July, 2013)



Water jet dredge



A new method of surf clam dredge fishing



We are developing a new fishing method incorporating a water jet dredge and fishing site selection using detailed rubble maps and GPS in Yamamoto town.