

JIMAR ANNUAL REPORT FOR FY 2008

P.I./SPONSOR NAME: Jock Young, Robert Olson, Valerie Allain and Jeffrey Dambacher

NOAA OFFICE (Of the primary technical contract): PIFSC

PROJECT PROPOSAL TITLE: Examining latitudinal variation in food webs leading to top predators in the Pacific Ocean (#657362)

FUNDING AGENCY: NOAA

NOAA GOAL (Check those that apply):

- ☒ To protect, restore, and manage the use of coastal and ocean resources through ecosystem-based management
- ☒ To understand climate variability and change to enhance society's ability to plan and respond
- ☐ To serve society's needs for weather and water information
- ☐ To support the nation's commerce with information for safe, efficient, and environmentally sound transportation

PURPOSE OF THE PROJECT:

A previous trophodynamics study funded by PFRP (PFRP Project #659559) has demonstrated significant heterogeneity in trophic pathways across the tropical Pacific, associated with either the prevailing mesoscale oceanography or the seabed topography. These results have the potential to not only identify shifts in ecosystem structure (climate change), but also may help to define stock structure of widely distributed tropical tunas. A similar, but more localized study off eastern Australia is also beginning to reveal differences not only within the region but also in comparison with the study in the tropical Pacific. Given the proximity of the two studies geographically and the potential migration of tunas between the regions, project researchers will conduct a study that compares the trophodynamics of the pelagic ecosystems of these regions using largely existing data sets. The analysis would combine statistical comparisons with qualitative models to determine similarities or otherwise of the two regions. Such comparisons may offer insight into the ecosystem impacts of potential climate change expressed as ocean warming. This project will compare stomach contents of top predators from tropical and temperate waters of the western, central, and eastern Pacific Ocean to examine latitudinal differences in the trophic pathways of these regions. The results will be used to develop and compare qualitative models of the trophic flows within each region.

PROGRESS DURING FY 2008:

The database was updated and now has data from CSIRO, SPC and IATTC pelagic feeding studies. Data from ~10,000 stomachs from 26 species are now entered along with accompanying environmental data. The data were assimilated and a series of qualitative model comparisons run for the three regions. Jeff Dambacher presented these results at the November 2007 PFRP meeting. A talk was also presented on the results at the First CLIOTOP symposium in La Paz, Mexico by Jock Young. Progress and future plans on the project were discussed by Jock Young, Robert Olson and Valerie Allain at the First CLIOTOP symposium in La Paz, Mexico in December 2007. A manuscript was later prepared (Dambacher et al. in review) and submitted to *Progress in Oceanography* as a contribution to a volume being published on the Symposium.

PLANS FOR THE NEXT FISCAL YEAR:

We plan to complete the study with a comparison of the qualitative model outputs from the three regions with a regression tree analysis of the combined feeding studies data sets. We will meet in Hawaii in 2008 at the PFRP conference to plan a manuscript.

LIST OF PAPERS PUBLISHED IN REFERRED JOURNALS DURING FY 2008

None during this reporting period

PAPERS SUBMITTED TO REFEREED JOURNALS

Dambacher, J.M., J.W. Young, R.J. Olson, V. Allain, M.J. Lansdell, and S.P. Cooper, 2008: Analyzing pelagic food webs leading to top predators in the Pacific Ocean: a graph-theoretic approach. *Progress in Oceanography*, CLIOTOP special issue (submitted).

OTHER PAPERS, TECHNICAL REPORTS, ETC.:

Olson, R.J. and J.W. Young (Eds.) 2007: The role of squid in open ocean ecosystems. Report of a GLOBEC-CLIOTOP/PFRP workshop, 16-17 November 2006, Honolulu, Hawaii, USA. GLOBEC Report 24: vi, 94 pp.

Maury, O., P. Lehodey, A. Garcia, F. Marsac, R.J. Olson, J. Young, R. Murtugudde and K. Miller, 2008: The first CLIOTOP Symposium: An overview. *GLOBEC INTERNATIONAL NEWSLETTER APRIL*. Vol. 14 (1): 59-63.

MEETING PRESENTATIONS:

Dambacher, J.M., J.W. Young, A.J. Hobday, S.P. Cooper, and M.J. Lansdell, 2007: Latitudinal variation in food webs leading to top predators in the Pacific Ocean. *PFRP Principle Investigators Workshop, Hawaii. November 2007*.

Young, J.W., R.J. Olson, V. Allain, J.M. Dambacher and A.J. Hobday, 2007: Latitudinal variation in food webs leading to top predators in the Pacific Ocean. *1st GLOBEC CLIOTOP Symposium. La Paz (Mexico). December 3-7, 2007*.

GRADUATES (Names of students graduating with MS or PhD degrees during FY 2008;
Titles of their Thesis or Dissertation):

None

AWARDS (List awards given to JIMAR employees or to the project itself during the
period):

None

PUBLICATION COUNT (Total count of publications for the reporting period and
categorized by NOAA lead author and Institute (or subgrantee) lead author and
whether it was peer-reviewed or non peer-reviewed (not including presentations):

	JI Lead Author	NOAA Lead Author	Other Lead Author
Peer Reviewed			
Non-Peer Reviewed			2

PERSONNEL:

For projects that awarded subcontracts in the fiscal year, please provide the number of
supported postdocs and students from each subgrantee.

None

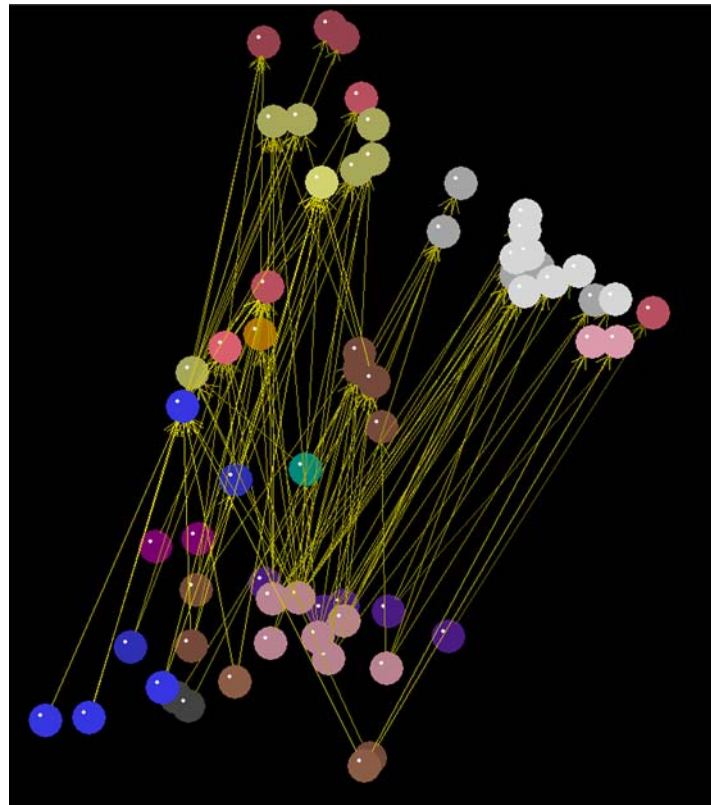
IMAGES AND CAPTIONS (We will also be including images for the annual report.

Please send two of your best high-resolution, color images (photo, graphic,
schematic) as a **JPEG or TIFF (300 dpi)** with a caption for each image. If you do
not have an electronic version of the image, a hardcopy version may be dropped off at
the JIMAR office located in the Marine Sciences Building, Room 312):

(NOTE: Figures are attached separately)

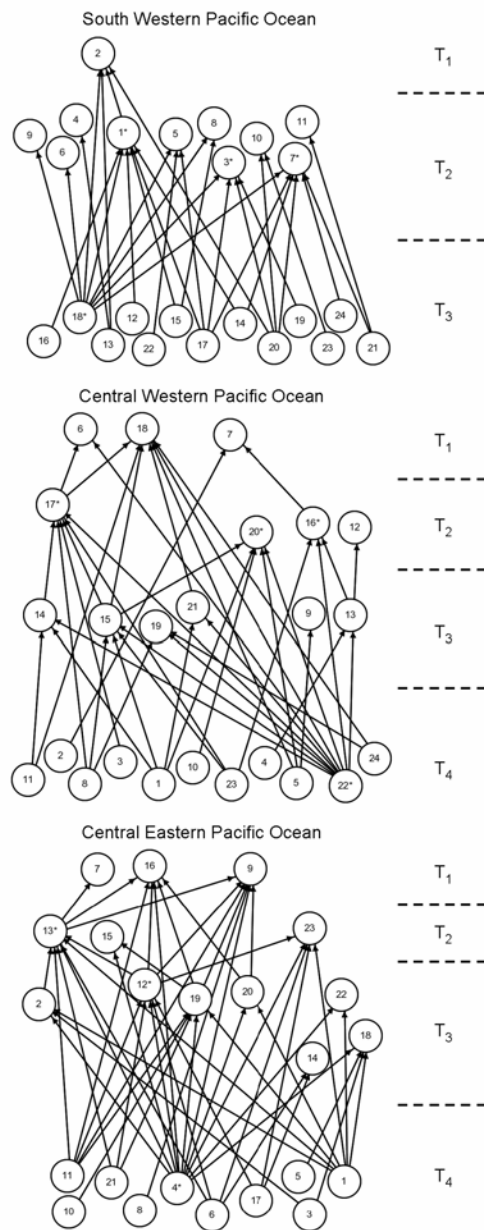
Figure 1. Aggregated food webs of three regions of the Pacific Ocean. Graph nodes
represent groups of species with similar predator-prey relationships and are arranged in
tiers with top predators in tier 1.

Figure 2. Pelagic food web leading to top predators in the central western Pacific Ocean.
Arrows lead from prey to predator species, nodes are coloured by group membership, as
determined from similarity of predator-prey relationships



young_food_webs08_Fig1. tif

Figure 1. Aggregated food webs of three regions of the Pacific Ocean. Graph nodes represent groups of species with similar predator-prey relationships and are arranged in tiers with top predators in tier 1.



young_food_webs08_Fig2.tif

Figure 2. Pelagic food web leading to top predators in the central western Pacific Ocean. Arrows lead from prey to predator species, nodes are coloured by group membership, as determined from similarity of predator-prey relationships