Job Creation and Marine Aquaculture

Steve Kolian and Paul W. Sammarco EcoRigs.org

The Socio-Economic Impacts of Sustainable Fisheries

There are currently no direct data available on the number of jobs or amount of income that could be generated in the US if retired oil and gas platforms were utilized for alternative energy sources or marine aquaculture in the Gulf of Mexico. Data do exist, however for similar activities in Japan. Data are also available regarding revenue generated by the introduction of artificial reefs in several US states bordering the Gulf of Mexico. Recently published data (MMS 2006) estimates that the Gulf oil and gas platforms generate $324 million every year in economic impact and create 5,560 full time jobs in our offshore sport fishing industry.

Similar data suggests that a new sustainable fisheries industry could directly employ 18,000 - 27,000 fishermen on the Gulf Coast by utilizing retired oil and gas platforms. Marine aquaculture would also provide indirect income and jobs to 100,000-150,000 in Louisiana's coastal communities.

Economic Analysis of Artificial Reefs

Area	Annual Economic Impact	Jobs	Source
Southeast Florida	$2.4 billion	26,800	Johns at al., 2001
Northwest Florida	$415 million	8,100	Bell et al., 1998
Mississippi	$78 million	No data	Southwick et al., 1998
Offshore platforms	$324 million	5,560	MMS 2006

Table 1. A summary of the socio-economic impact (revenue and employment generation) of the introduction of artificial reef programs to two Gulf of Mexico states. The 4,000 offshore oil and gas platforms across the northern Gulf of Mexico constitute the largest collection of artificial reefs in the world and far surpass the artificial reefs deployed in Florida in both size and numbers.

Artificial Reef Programs in Gulf States

Florida has conducted two independent socio-economic studies on impacts of the introduction of artificial reefs into its waters. Mississippi has conducted a third study. Table 1 demonstrates the substantial impacts on their economies which have resulted from this activity. Interestingly, the numbers and sizes of the Florida artificial reefs are nominal in comparison to the Gulf's offshore petroleum exploration and production structures. The Gulf's platforms repre-

Japanese Survey of Vessels per Unit of Artificial Reef (20,000 m3)

Survey Source	Number of Vessels
Taira Matsuoka	2
Hiroshi Kakimoto	20
Makoto Nakamura	5
Kokichi Kanamori	20
Hitashi Nagano	6
Average	10.6
Standard Deviation	9

Table 2. Results of a survey of five sustainable fishery researchers from Japan regarding the number of vessels that can be supported by 100,000 m3 of artificial reef. This number was converted to 20,000 m3 (the volume of an average 100 ft platform jacket).

sents the largest and most dense collection of artificial reefs in the world, and their collective value as artificial reefs is estimated to be $13.2 billion (Kolian and Sammarco 2005).

Japanese Sustainable Fisheries

Japan has the most sophisticated sustainable fisheries system in the world. In recent years, the Japanese have collected data on the actual number of vessels that can utilize a given unit of artificial reef. In 1995, one of us (SK) conducted a survey of Japanese researchers to determine the relationship between artificial reef structures and the number of fishing vessels those structures could support, by volume. Japanese researchers were asked how many vessels 100,000 m3 of artificial reef sustain over a year (Table 2).

The Japanese data indicate that one Japanese vessel with a crew of 3-5 would be able to successfully extract fish from 1,886 m3 of artificial reef habitat over the period of one year in a sustainable fashion. To illustrate the size comparison, the jacket of one platform deployed at 100 ft depth on the continental shelf has a volume of ~20,000 m3; one

Vessels per Volume of Platform Structure (94,450,806 m^3)

Volume of Artificial Reef (m3)/Vessel	Value of Artificial Reef @ $140/m3 (1)	Number of Vessels	Crew/vessel	Fishing Jobs
10,000	$1,400,000	9,445	4	37,780
20,000	$2,800,000	4,723	4	18,890
30,000	$4,200,000	3,148	4	12,593

1 Cost to build and install artificial reefs is about $140/m3 (Kolian and Sammarco 2005)

Table 3. Examples of the number of vessels which could be supported and the number of jobs created under a variety of artificial reef volumes, to be used as the basis for licenses. Data are based on the total volume of 94.4 x 10^6 m^3 currently available through US oil and gas platforms in the Gulf of Mexico.

large Japanese artificial reef has a volume of ~750 m3 (Takafumi per comm. 2003). Note that Japanese artificial reefs are much smaller than oil and gas platforms and are generally more widely dispersed across the ocean floor per unit of habitat.

The oil and gas platforms of the US EEZ in the Gulf of Mexico represent ~94.4 x 106 m3 of artificial reef substratum suitable for natural production of fish.[1] Based on these data, if this volume of oil and gas platforms were allocated or licensed to individual fishing vessels in volumetric units of, say, 20,000 m3, one can calculate the number of vessels that could be supported by this subset of 2,200 platforms currently deemed suitable for this type of use in the Gulf (Table 3). Note that the allocations would support on the order of thousands of vessels anywhere within this volumetric range. The Japanese, according to the survey, could employ ten vessels with 20,000 m3 of artificial reef habitat. In our calculations, we are assuming that one vessel would utilize 20,000 m3 of platform structure.

Conclusion

Data from other Gulf states suggest that artificial reefs generate a significant economic impact and create tens of thousands of jobs. A preliminary survey of Japanese researchers suggests that about 1,886 m^3 of artificial reef habitat would be required to sustain one fishing vessel. Nevertheless, it should be recognized that the artificial reefs in Japan are much smaller (750 m^3) and are deployed in much lower densities than those in the US. Our offshore platforms are much larger and stronger, averaging ~20,000 m^3 in size (at a 100 ft depth). If the 94.4 million m^3 of platform habitat currently available (2,200 in number) were made available to vessels in increments of 20,000 m^3 the platforms would support 4,723 fishing vessels and create 18,890 fishing jobs in the area of sustainable fisheries.

1 This figure includes about 2,200 of the 4,000 platforms in the Gulf. These platforms are the large structures (major structures of 6 wellheads or more) found in waters greater than 50ft of water.

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2925 Brakely Dr. Suite A
Baton Rouge, Louisiana 70816
USA

For More Information, Please Contact:

Steve Kolian
stevekolian@hotmail.com
225-910-0304

Paul Sammarco
psammarco@lumcon.edu
985-851-2876

Please visit www.ecorigs.org for more information on the marine organisms inhabiting offshore oil and gas platforms in the Gulf of Mexico.