

**Resource Rent and Royalty Payment Methods for the
Red Snapper Individual Fishing Quota Program**

During its January 2018 meeting in New Orleans, LA, the Gulf of Mexico Fishery Management Council approved the following motion:

Motion: To instruct staff to start a white paper exploring rents/royalties in the Gulf commercial red snapper fishery for allocation above 4.65 million pounds. The white paper should include but not be limited to: a definition of rents/royalties, examples of resource rent collection in other public resource uses, a calculation of Gulf red snapper rents/royalties value, alternative methods of rents/royalties collection and alternative methods for redistribution of shares.

This document is prepared in response to the Council’s motion and is expected to support the Council’s upcoming discussions.

I - Resource Rent

According to Arnasson (2006), even studies that extensively discuss resource rent often fail to include clear and concise definitions for resource rents. Jensen and al. (2015) note that some economists have not referred to resource rent in a consistent way, i.e., resource rent can mean different things to different economists. This document defines and discusses resource rent within the context of the commercial red snapper individual fishing quota (IFQ) program.

Resource rent can be defined as the difference between total revenues and total input opportunity costs (Homans and Wilen, 2005; Jensen et al., 2015). In general, the opportunity cost of a particular input, e.g., labor, is the value of the best alternative use for that input. It follows from the definition above that resource rents are not constant and can be augmented by increasing ex-vessel price, which translates into higher total revenues, or by reducing input use. For a given fish stock, the resource rent is equivalent to the net economic benefits derived from the harvests of that particular stock (World Bank, 2009). Gordon’s (1954) landmark article establishes that resource rent is completely dissipated, i.e., equals to zero, when a fishery is managed under open access. Resource rent is a function of the property rights regime created by the management system, which is why Anderson (1977) has referred to it as “management rent.” For additional discussion on resource rent see for example DFID (2004), OECD (2006), and Flaaten et al. (2017).

For a fishery managed under an IFQ program, the resource rent derived from a pound of quota can be approximated by the “lease price” of the pound of quota, i.e., the annual allocation transfer price (Newell et al. 2005). Therefore, for the red snapper IFQ program, the amount of resource rent generated by the fishery annually is computed by multiplying the allocation

transfer price by the annual red snapper harvest. Red snapper landings and allocation transfer prices are provided in Tables 1 and 2, respectively.

Table 1. Red snapper commercial quotas and landings (gutted weight).

Year	Dec 31 Quota	Landings	Landings % of Quota
2006**	4,189,189	4,188,290	99.90%
2007	2,986,486	2,867,326	96.00%
2008	2,297,297	2,237,480	97.40%
2009	2,297,297	2,237,446	97.40%
2010	3,190,991	3,056,044	95.80%
2011	3,300,901	3,238,335	98.10%
2012	3,712,613	3,636,395	97.90%
2013*	5,054,054	4,908,598	97.10%
2014*	5,054,054	5,016,056	99.20%
2015*	6,570,270	6,472,261	98.50%
2016*	6,097,297	6,057,498	99.40%

*: Years with a quota above 4.65 million pounds;

** : Baseline prior to IFQ implementation.

Table 2. Nominal and inflation-adjusted average annual allocation transfer prices.

Year	N*	% of all transfers	Avg. price/lb	Avg. price/lb (\$2016)
2007	155	19%	\$1.97	\$2.26
2008	152	22%	\$2.31	\$2.59
2009	283	34%	\$2.69	\$3.00
2010	344	20%	\$2.88	\$3.18
2011	476	22%	\$2.96	\$3.19
2012	781	31%	\$3.00	\$3.18
2013	1,068	39%	\$2.98	\$3.10
2014	1,382	48%	\$3.03	\$3.10
2015	1,562	46%	\$3.09	\$3.13
2016	1,891	51%	\$3.21	\$3.21

*: Number of allocation transactions that had prices between \$1.20/lb and \$5.00/lb for 2007-2009 and \$1.80 - \$5.00 for 2010 onward.

In its January 2018 motion (provided above), the Gulf Council expressed interest in the resource rent for commercial red snapper quotas in excess of 4.65 million pounds (mp). There is a 1.37 mp difference between the 2018 commercial (6.02 mp) and this threshold. Based on a 2016 average annual allocation transfer price of \$3.21 per pound, the resource rent that would be derived from the amount of commercial red snapper quota above 4.65 mp would be approximately \$4.4 million.

II - Auctions and Royalty Collection

In Section 303A (d), the Magnuson-Stevens Fishery Conservation and Management Act (MSA) stipulates that:

In establishing a limited access privilege program, a Council shall consider, and may provide, if appropriate, an auction system or other program to collect royalties for the initial, or any subsequent, distribution of allocations in a limited access privilege program if—

(1) the system or program is administered in such a way that the resulting distribution of limited access privilege shares meets the program requirements of this section; and

(2) revenues generated through such a royalty program are deposited in the Limited Access System Administration Fund established by section 305(h)(5)(B) and available subject to annual appropriations.

With respect to the methods by which royalties can be collected, these MSA provisions are open-ended because they do not prescribe specific methods to be used. Provided that Councils conform to the stipulations of Section 303A (d), they have the latitude of designing royalty collection systems as they see fit. Examples of potential royalty collection methods for limited access privilege programs, including fees assessed on the initial amount allocated, transfer fees, royalties based on gross revenues, and usage fees, are provided in Anderson and Holliday (2007).

a) Auctions in Fisheries

To date, none of the catch share programs in the US has relied on auctions as a share or annual allocation distribution or redistribution method. Therefore, the following discussion is based on IFQ programs outside the United States.

The distribution of catch shares by auction in fisheries is uncommon (Anferova et al. 2005; Huppert 2007). Common distribution methods are based on historical catch records, equal allocation among eligible participants, and vessel or gear attributes. Lynham (2014) evaluated catch share programs based on the initial allocation method(s) used. Of the fisheries studied, fisheries in four countries have used auctions in the initial distribution of harvest privileges: Chile, Estonia, New Zealand, and Russia. Auctions were used in 3% of the initial distribution of harvest privileges, while 54% allocated all or nearly all shares based on historical catch, 6% used equal distribution, and 37% used a combination of these methods (Lynham 2014). Mexico uses competitive bidding to allocate access to fishing privileges in some fisheries (OECD 2006).

b) Auctions and Other Natural Resources

Auctions and other royalty payment mechanisms are commonly used to collect revenues from the use of other natural resources. The European Union partially relies on auctions to allocate carbon dioxide emission credits (OECD 2006). Here in the US, the federal government uses auctions and other royalty payments to collect revenues from a variety of resources including oil and gas, coal, and solar and wind energy. For these resources, federal revenue collection system combines auctions (or bonuses), annual rental fees, and royalty fees expressed as a percentage of the production value (DOI 2018). For example, for onshore oil and gas leases, the government receives a bonus (highest bid recorded), charges an annual rental fee between \$1.50 and \$2.0 per acre, and collects 12.5% of the production value in royalties.

Methods to distribute quota discussed in this document include allocation based on historical catch, equal distribution, vessel or gear attribute, auctions and other royalty payment systems. In addition to these, the Council could consider quota set-asides and lottery systems. In the programs that are discussed, the allocation methods used, including auctions, are implemented at the onset of the program. We have yet to encounter a scenario under which the royalty collection methods have been introduced subsequent to program implementation, thereby possibly requiring a redistribution of previously allocated harvest privileges, i.e., shares and annual allocation.

III - REFERENCES

- Anderson, C.M. and D. S. Holland. 2006. Auctions for initial sale of annual catch entitlement. *Land Economics* 82(3):333-352.
- Anderson, L.G. 1977. *The Economics of Fisheries Management*. Johns Hopkins University Press. Baltimore.
- Anderson, L.G., and M. Holliday. 2007. The Design and Use of Limited Access Privilege Programs. Technical memorandum NMFS-F/SPO-86. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.
- Anferova, E., M. Vetemaa, and R. Hannesson. 2005. Fish quota auctions in the Russian Far East: a failed experiment. *Marine Policy* 29:47-56.
- Arnason R. 2006. Fisheries Rent: Theoretical Basis and an Example. IIFET 2006 Portsmouth Proceedings
- DFID. 2004. Resource Rents: Fiscal Reform in Fisheries. United Kingdom Department for International Development
- DOI (Department of Interior). 2018. Natural Resources Revenue Data. Website accessed 4/3/18 <https://revenuedata.doi.gov/how-it-works/revenues/#federal-lands-and-waters>
- Flaaten O., K. Heen, and T. Mathiasson. 2017. Profit and Resource Rent in Fisheries. *Marine Resource Economics*. 32:3 pp 311-328
- Gordon, H.S., 1954. The economic theory of a common property resource: the fishery, *Journal of Political Economy*. 62:124-142.
- Frances R. Homans, F.R. and J. E. Wilen. 2005. Markets and rent dissipation in regulated open access fisheries. *Journal of Environmental Economics and Management* 49 (2005) 381–404
- Huppert, Daniel D. 2007. Auctions of IFQs as a means to share rent. Pages 74-86 in Trond Bjørndal, Daniel V. Gordon, Ragnar Arnason, and U. Rashid Sumaila, Editors. *Advances in Fisheries Economics*. Blackwell Publishing, Ames, Iowa.
- Lynham, John. 2014. How have catch shares been allocated? *Marine Policy* 44:42-48.
- Newell, R.G., K. L. Papps, and J. N. Sanchirico. 2005. Asset Pricing in Created Markets for Fishing Quotas. *Resource for the Future* DP 05-46.

OECD (Organization for Economic Co-operation and Development). 2006. Using Market Mechanisms to Manage Fisheries.

Vetemaa, M., M. Eero, and R. Hannesson. 2002. The Estonian fisheries: from the Soviet system to ITQs and quota auctions. *Marine Policy* 26:95-102.

World Bank; Food and Agriculture Organization. 2009. *The Sunken Billions: The Economic Justification for Fisheries Reform*. Agriculture and Rural Development. World Bank.