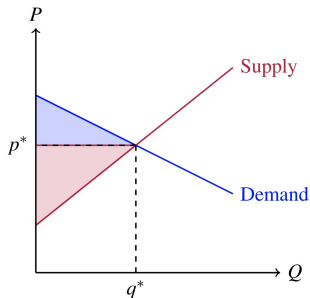


The Economics of HABs



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How do we conceptualize and measure the economic impacts from HABs and their management?

Benefits

- People receive benefits when we give them something they value
- How do we know people value something?
 - We know by the fact that they are willing to sacrifice, or willing to pay, for it
- **Benefits**: The benefits people get from something are equal to the *maximum* amount they are willing to pay (WTP) for it

Benefits

What are the benefits from a small-scale oyster operation?

- The maximum amount consumers are WTP for all production from the farm
- The maximum amount consumers are WTP for any other benefits generated by oysters such as environmental benefits

Costs

- Many goods and services we want have associated costs
- **Opportunity costs**: the maximum value we give up by doing one thing instead of something else
- Includes both explicit and implicit costs

Opportunity costs

What are the opportunity cost of a small-scale oyster operation?

Opportunity costs include:

- The cost of labor hired and the cost of equipment
- The foregone salary of the business owner
- The value of the best alternative use of the estuarine environment used to grow the oysters

External benefits and costs

- **External benefits:** benefits generated with the production or consumption of a good or service that are not considered by the producer or consumer, because they are not compensated for the benefits
 - Oysters can purify the water (external benefit)
- **External costs:** costs generated with the production or consumption of a good or service that are not considered by the producer or consumer, because they do not pay for the costs
 - Oysters can displace recreational activities (external cost)

Types goods

- **Private goods:** a good for which its owners can exercise private property rights and consumption by one necessarily prevents that of another
 - Examples include: cars, cereal, and aquaculture products
- Most commercial wild capture fisheries are different from a typical private good
- In many cases there is no market for recreational fisheries

Markets for private goods ignoring externalities

- **Markets**: institutions in which buyers and sellers of goods and services carry out mutually agreed-upon exchanges
- Buyers want to pay a low price and sellers prefer a high price
- Markets bring these conflicting objectives into balance

Consumers and market demand

- The **market demand curve** aggregates the quantity demanded by all consumers in the market for each price
- Consumers get a **consumer surplus** whenever they pay less for something than they would be willing to pay

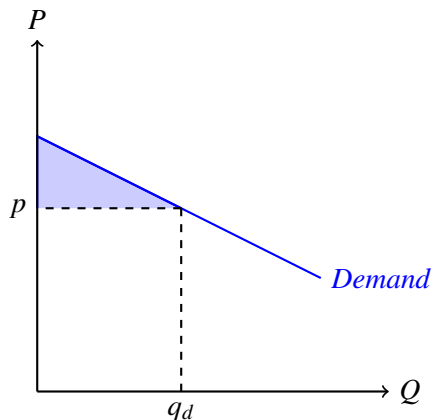


Figure: Annual US Oyster Demand

Producers and market supply

- The **market supply curve** aggregates the quantity supplied by all firms in the market for each price
- Producers get a **producer surplus** whenever they receive a price higher than the minimum price they would accept

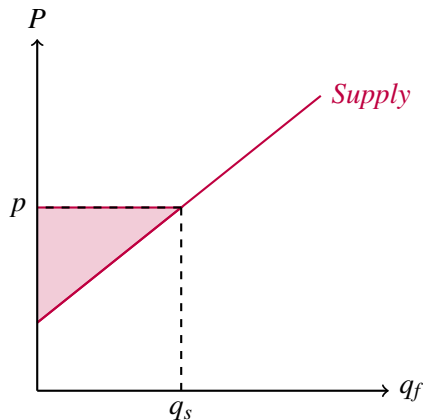


Figure: Annual oyster supply to the US

Market outcomes

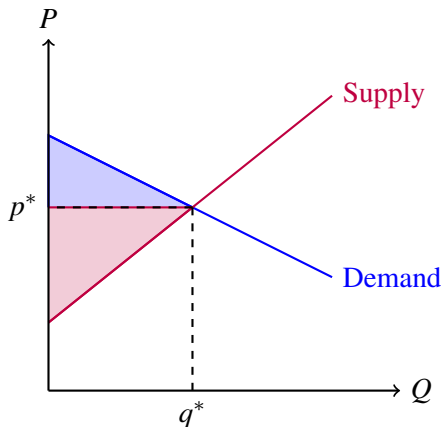
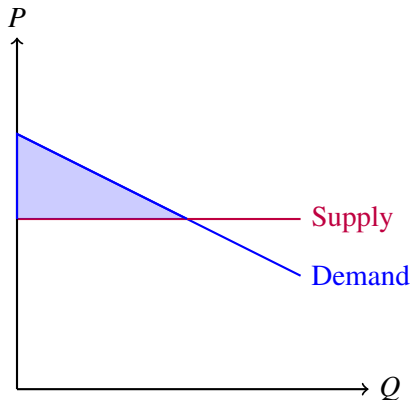


Figure: Annual US oyster market

The **economic value** in this market is the sum of consumer surplus (blue triangle) and producer surplus (pink triangle).

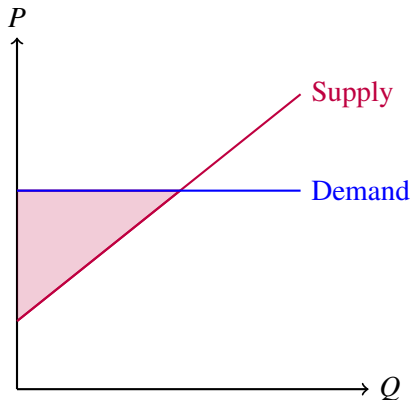
Market supply and demand



When is the supply curve flat?

- When there is no variation in quality of oyster habitat

Market supply and demand

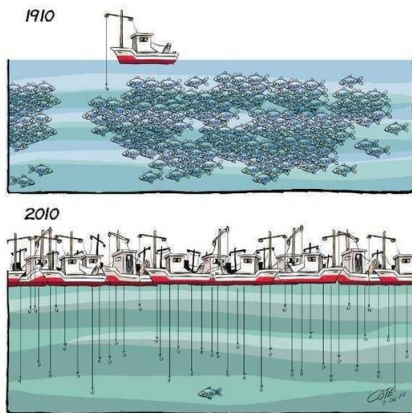


When is the demand curve flat?

- Small player in the market
- Consumers don't care where the product comes from

Short-run market frictions and/or value for local seafood may mean the demand curve is not flat

Wild-capture fisheries



Recreational fisheries

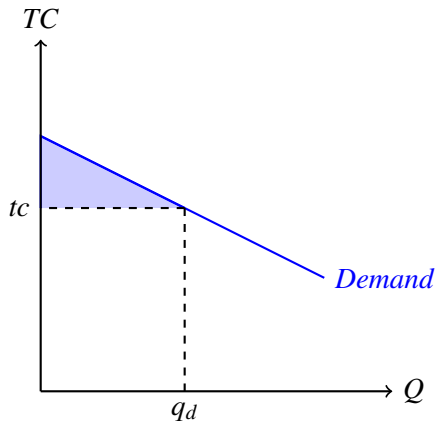


Figure: Annual Recreational Walleye Demand

The need for a counterfactual

A **counterfactual analysis** compares observed outcomes to a model of what would have happened without the HAB



Cost-Benefit Analysis

- A **cost benefit analysis (CBA)** measures changes in economic value associated with various policy alternatives for managing HABs
 - Value includes consumer and producer surplus *and* any external costs and benefits
 - Short of a full CBA, one can measure one or more component(s) of economic value

Measuring impacts to Economic Value

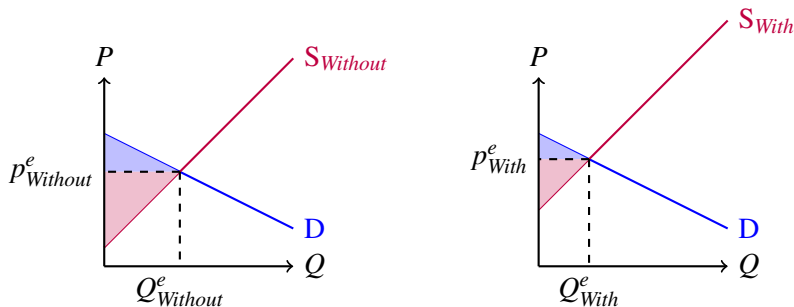


Figure: Without HAB (left) with HAB (right)

Measuring welfare impacts

Journal of Shellfish Research, Vol. 7, No. 4, 677–682, 1988.

MEASURING THE ECONOMIC EFFECTS OF BROWN TIDES

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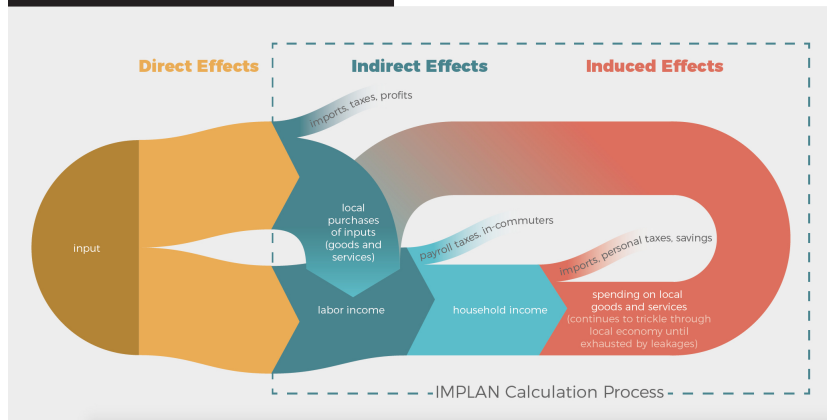
Recreational Demand for Shellfish Harvesting Under Environmental Closures

Leif E. Anderson and Mark L. Plummer[†], *Northwest Fisheries Science Center*

Economic Impact Analysis

Measures changes in economic outcomes, e.g. expenditures and employment, due to a HAB.

HOW DOES AN ECONOMIC IMPACT STUDY COME TOGETHER?



Economic Impact Analysis

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Regional economic impacts of razor clam beach closures due to harmful algal blooms (HABs) on the Pacific coast of Washington

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