

tourism (with the exception perhaps of some **cruise**-specific travel agents), with the overall growing popularity of marine tourism activities there is plenty of justification for travel agents to encourage and promote the sale of activities such as cruises, **scuba-diving**, **fishing** and **marine wildlife viewing**. The current high rates of growth, especially in the **cruise industry**, combined with high trip prices – to which commissions still apply – and the many long-term and regular customers, provide good reasons for travel agents to continue and/or increase their sales of marine travel products.

Related internet sources

The American Society of Travel Agents: <http://www.astanet.com/index.asp>

Association of British Travel Agents: <http://www.abta.com>

TUI: http://www.tui.com/landingpage/landingpage_En.htm

Anchors Away Cruise Agency: http://www.mustcruise.com/html_index.html

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Travel Cost Method (TCM) The travel cost method is a statistical approach that can be used to estimate the economic value of coastal recreational sites. It uses observations of how often people visit a particular **recreation** site (for example, **beach**, **fishing** area, **park**) given the price of visitation. The site 'price' consists of travel costs, entry fees (if any) and an allowance for the value of people's travel time. The oldest TCM studies used a simple aggregation of visitors from different geographic zones. Virtually all modern research incorporates survey information gathered from individual visitors (for example, travel distance and costs, number of visits per year, other activities during the trip, etc.) to increase the precision of economic estimates. For example, the TCM may be used to estimate **willingness to pay** for changes in access or incremental improvements in site attributes (for example, water quality, fishing success or reduced crowding, etc.) at a particular recreation site.

In the most comprehensive TCM studies, researchers assume that individuals choose the one recreation site that they most prefer from

many possibilities. Costs, environmental characteristics, anticipated congestion and attributes of competitive sites or activities may influence each person's recreation choices differently. When information is available for many individuals and multiple sites, the TCM can be used to evaluate how changes at one site affect visitation patterns and aggregate economic **impacts** over many sites simultaneously. Unlike the **contingent valuation method**, the travel cost method is relatively uncontroversial because it relies on observed, rather than on hypothetical, behaviour and uses standard economic techniques to measure value.

Related internet sources

Ecosystem Valuation Website: http://www.ecosystemvaluation.org/travel_costs.htm

Environmental Valuation Reference Inventory (EVRI): <http://www.evri.ec.gc.ca/evri>

Murray A. Rudd

Trawling Trawling is a method of **fishing** that involves a cone-shaped net pulled behind one or more boats. Animals are swept into the net and collect at the end of the cone (the cod end or bag). The nets can be operated throughout the water column. Most recreational trawlers use a single trawl towed behind their outboard-powered boats. Recreational trawling is for personal use as food and bait for angling (hook and line fishing). Bait of interest is primarily juvenile penaid shrimp that occur at the ocean bottom. Shrimp in the south-eastern USA are harvested by recreational users primarily during the autumn shrimp-baiting season (May to December). What gets caught in the nets depends in part on the gauge of the net (see Fig. T4).

Numerous studies have documented the central importance of aesthetic, psychological, spiritual, educational and other non-catch **values** to recreational fishing. The importance of relaxation and escaping the daily routine, being with friends and experiencing natural surroundings are all important reasons (for example, Fedler and Ditton, 1986). Trawling is also a way for the public to experience and understand the biodiversity of an area. For example, there are educational outreach programmes where students of all ages catch a



Fig. T4. Bottlenose dolphins (*Tursiops truncatus*) and laughing gulls (*Larus atricilla*) with a bait shrimp trawler in Galveston Bay, Texas, Gulf of Mexico (photograph courtesy of D. Fertl).

variety of marine life in a single trawl that they learn to identify.

Although commercial and recreational trawling today is heavily regulated in some areas, it remains the target of many protests by environmentalists who consider this fishing method to be a great threat to biodiversity of an area. Trawling also has socio-economic concerns in terms of **impacts on tourism** – there have been situations with significant amounts of bycatch washing onto **beaches** and into waters used heavily for **recreation** and tourism, affecting the aesthetics of the area.

Environmental concerns related to large-scale, commercial bottom-trawlers include lack of selectivity and the physical damage that the trawl does to the seabed (National Research Council, 2002; Chuenpagdee *et al.*, 2003). Bottom-trawling involves heavy fishing gear towed over the seabed at a speed of several knots, which is destructive to the ocean bottom (Watling and Norse, 1998). Trawl nets may be non-selective, sweeping up both marketable and undesirable fish, and fish of both legal and illegal size. Any part of the catch that cannot be used is considered as bycatch. Bottom-trawling has the highest bycatch rate of all types of trawling.

Additionally, since recreational trawling often takes place in **estuaries** where juvenile fish are

found, and the nets used are often of finer mesh than those in commercial shrimp nets, recreational shrimp trawlers often have relatively high ratios of finfish bycatch when compared with those of commercial trawlers. Bottlenose **dolphins** (*Tursiops* spp.) in particular are attracted to bottom-trawling activities for fish that are injured or disoriented; these are easier to catch than healthy individuals of the same species actively avoiding capture (see for example, Fertl and Leatherwood, 1997). Also, various bird species swarm over trawling **vessels** while the catch is being sorted and feed on the bycatch as it is discarded over the side of the boat. Notably, **marine mammals**, **sea turtles** and **seabirds** can all become victims of trawls by becoming entangled in the nets (Fertl and Leatherwood, 1997), thereby removing charismatic megafauna of particular interest to both tourism and recreation.

See also: Dolphin, Fishing, Marine Ecotourism, Sea Turtle.

Related internet sources

Bibliography of the effects of fishing gear on the seabed and benthic communities: <http://home.istar.ca/%7Egadus/ImpactBiblio.pdf>

Bycatch Reduction Devices: <http://www.seagrantfish.lsu.edu/management/TEDsandBRDs/brds.htm>

Recreational shrimping: <http://www.shrimpin.com>

Sea Camp: <http://www.tamug.edu/seacamp>

Shrimp otter trawling: <http://www.fao.org/figis/servlet/fishtech?fid=1021>

Turtle Excluder Devices (TEDs): <http://www.nmfs.noaa.gov/pr/species/turtles/teds.htm>

Dagmar Fertl

Trench: see Deep Sea Trench

Tripartite Agreement The Cooperative Agreement for the Conservation of **Sea Turtles** of the **Caribbean** Coast of Costa Rica, Nicaragua and Panama, or 'Tripartite Agreement', was developed over a period of 4 years by a consortium of Central American government officials, **indigenous peoples**, **non-governmental organizations** and **sea turtle** specialists. It was spearheaded by The Caribbean Conservation Corporation, an NGO active in the region for decades. The agreement was signed by the Presidents of Costa Rica and Panama in San José, Costa Rica on 8 May 1998, during the inauguration ceremonies for Costa Rica's newly elected President, Miguel Ángel Rodríguez.

This non-binding, trilateral agreement was created to promote greater cooperation, research and management of green, hawksbill and leatherback sea turtles, which are known to **migrate** freely between the three nations. It complies with Article XII, International Cooperation, of the **Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC)** as a subregional accord under the larger umbrella of the hemispheric treaty. However, Nicaragua has not signed the Tripartite Agreement nor ratified the IAC. One major difficulty is the lack of consolidation between different sectors in Nicaragua, particularly the long history of conflict between the autonomous regions of the Caribbean and the central government in Managua. Whether or not this trilateral agreement can be reactivated to promote effective collaboration between the three neighbouring states is unclear, but none the less it serves as an example of the bout of enthusiasm that occurred in the 1990s for creating multilateral agreements specifically for the **conservation** of sea turtles.

See also: IAC, IOSEA, TIHPA.

Related internet sources

Cooperative Agreement for the Conservation of Sea Turtles of the Caribbean Coast of Costa

Rica, Nicaragua and Panama: <http://www.cccturtle.org/tri-engl.htm>

Caribbean Conservation Corporation: <http://www.cccturtle.org>

Jack Frazier

Tropic of Cancer The Tropic of Cancer is the parallel of **latitude** 23°27' north of the **equator**, which is the northernmost latitude at which the sun can shine from directly overhead.

Andrew J. Wright

Tropic of Capricorn The Tropic of Capricorn is the parallel of **latitude** 23°27' south of the **equator**, which is the southernmost latitude at which the sun can shine from directly overhead.

Andrew J. Wright

Tropical Kayaking Tropical kayaking occurs in warm waters only, allowing open and free **sit-on-top kayak** styles, where the paddler becomes as one with the marine **environment** rather than becoming insulated from harsh, cold waters. Tropical kayaking also involves different skills such as paddling and **surfing** on and around **coral reefs**, tropical weather forecasting and navigating isolated **islands** with offshore winds.

John Gray

True North True north is the direction of the geographic **North Pole** as seen on charts, maps and globes. The geographic North Pole defines the northern axis of the Earth and the point on maps equal to **latitude** 90°N. From true north, all directions are south. Like true south, it was invented by cartographers (map makers) to enable ships to **navigate** using longitude and **latitude**. It differs from the **magnetic North Pole**, which is the North Pole towards which compasses point. The magnetic pole is not really a pole, but an area of molten iron approximately 3000 km below the Earth's crust. Shaped like a bar magnet, the molten iron is also influenced by charged particles from the sun. Neither the