Comments of the
North American Submarine Cable Association
on the Advance Notice of Proposed Rulemaking,
"Installing and Maintaining Commercial Submarine Cables
in National Marine Sanctuaries",
65 Fed. Reg. 51264 (Aug. 23, 2000)

These comments are submitted on behalf of the North American Submarine Cable Association ("NASCA"). NASCA was recently formed to help those who own, install and maintain submarine cables[1] that land in North America better address issues of common concern. Companies participating in NASCA to date are listed in Attachment 1. Some of those listed are also submitting their own separate comments on the above notice ("the ANPRM"). All of the listed members of NASCA support the comments presented here, subject to the views expressed in their separately submitted comments.

These comments by NASCA seek to complement rather than duplicate those individual comments, by providing a summary of basic factual issues that underlie the policy issues raised in the ANPRM.[2] Part I describes the public purpose and demand for such projects, and responds to NOAA's overestimate of the rate at which additional such projects likely will be installed. Part II provides a factual overview of how submarine cables are planned, installed and repaired. Part III briefly describes the minimal environmental impacts of such projects. For support, Part III refers NOAA to a number of extremely thorough recent government reviews of such projects, which are attached.

I. SUBMARINE CABLES: WHY & HOW MANY?

Submarine telecommunications cables have been laid for over 150 years, starting with telegraph cables (the first transatlantic telegraph cable was laid in 1858). The development of fiber-optic technology since the 1970s has brought tremendous increases

[1] Consistent with the ANPRM, these comments address only submarine telecommunication cables, which for brevity are referred to here as "submarine cables".

[2] The ANPRM requests comments on (1) whether rulemaking or new policy guidance is necessary to clarify NOAA decisionmaking regarding the installation and maintenance of commercial submarine cables within National Marine Sanctuaries ("NMSs"), and if so, what changes would be appropriate; (2) the principles NOAA articulated in a draft white paper released February 23, 2000 for purposes of a workshop convened by NOAA on February 28 and 29; and (3) NOAA's "initial reactions" to the issues addressed therein, as articulated in the ANPRM. Most of these issues are addressed by one or more of NASCA's members in their individual comments. NASCA's emphasis in these comments on the key factual underpinnings of the policy issues does not mean that NASCA agrees with NOAA statements or policy suggestions not addressed here. To the extent NOAA pursues this rulemaking or policymaking process, NASCA will if appropriate comment on those issues as well.

in capacity per cable, among other advantages[3], and virtually all submarine cables installed since the late 1980s have been fiber-optic.

In the last few years, demand for international telecommunications capacity has greatly increased, due in large part to exploding use of the Internet. The telecommunications industry response to this demand included several international projects being developed on each coast almost simultaneously. It is this recent spurt in construction activity that seems to have captured the attention of NOAA.

However, the ANPRM greatly overstates the likely rate at which additional submarine cables will be landed in the U.S. The ANPRM states that "200 new cable systems with over 1,000 shore landings are projected by 2003". The ANPRM does not identify its source for this estimate, and ignores information previously submitted by the cable industry indicating that this estimate is greatly overstated.[4] Such extreme overestimates may create needless fears in the minds of government officials and the public.

One way to predict the actual future rate of submarine cable construction is instead to look at predictions of total demand. One can make a reasonable assumption that industry will supply approximately the amount of capacity that market demand will support. As noted above, for the last several years demand for international telecommunications capacity has been increasing quickly. This increase has been driven primarily by demand for Internet services and data transfer rather than voice calls; it also has been driven by increased competition worldwide, which has led to lower prices and thus increased demand. Most expect the trend of increasing demand to continue for the foreseeable future.

However, the continuing increase in demand is being offset by a continuing increase in cable carrying capacity. Silicon-based computer chips are said to double in power every 18 months ("Moore's Law"), but fiber-optic transmission capacity is increasing even faster. DWDM (dense wavelength division mutiplexing) technology splits light into separate wavelengths (colors) that can simultaneously carry information through a fiber-optic strand as separate channels. Through continuing improvements in the technology, the number of wavelengths that a single fiber can carry simultaneously is doubling every year, and this trend is expected to continue.[5] (For example, 80-wavelength systems are available this year and 160-wavelength systems will be introduced next year (for terrestrial and repeaterless submarine systems); researchers are

---

[3] There are not enough available geostationary orbit positions available for satellites to satisfy the demand for international telecommunications capacity. The role of satellites therefore has been largely reduced to providing emergency back-up to submarine cables, and reaching places that cable systems do not yet reach.

[4] Comments of AT&T Corp. submitted under letter by Paul Shorb to David Festa (April 10, 2000).

[5] Polishuk, P., "An Analysis of Submarine Traffic and Market Trends – Impact on the Demand for New Submarine Cables," prepared for and presented to the International Cable Protection Committee May 3, 2000.

already experimenting with 1,000-wavelength systems.)[6] Repeated submarine systems follow the same progression, a few years behind; 16-wavelength systems were available last year, 32-wavelength systems are available this year, and this trend is expected to continue.[7] In addition, researchers are continuing to increase the rate at which the lasers can turn on and off the pulses of light in each wavelength. (For example, systems currently being installed have an "optical carrier" rate of 10 gigabits (or 10 billion bits) of information per second; researchers are already developing terabit lasers (1 trillion bits/second).)[8]

Furthermore, submarine cables are being installed now that can subsequently be upgraded to greater transmission capacities by upgrading only the land-based equipment when the next improvements in DWDM and laser pulse rate become available. This will further reduce the need to install additional cables as demand for capacity increases.

In summary, the recent spike in permitted projects represented cable companies simultaneously reacting to an unprecedented increase in demand. That led to permitting of more North American submarine cable projects in the last year than probably will occur in the following year, or in future years on the average.[9] Improvements in technology are helping keep pace with demand. Weighing the related factors of demand, cost, and technology, industry analyst reports suggest that the number of new cable systems predicted in the ANPRM is extremely exaggerated. Those reports suggest instead that on average over the next five years, only a relatively small number of new systems will be landed in North America per year.

II. HOW SUBMARINE CABLES ARE PLANNED, INSTALLED AND REPAIRED

A. How Submarine Cable Routes Are Selected

Cable system route planning is a process of marrying the needs of the owner with the physical and regulatory restrictions regarding construction. Key restrictions include the need to connect efficiently to selected cities or stations; protecting the cable from geologic hazards; protecting the cable from human hazards; considering potential repair scenarios; minimizing conflicts with other users of the seabed; and minimizing impacts on any sensitive environmental receptors (e.g., reefs). Route planning is a lengthy process of balancing these criteria, which sometimes are at odds with each other.

---

[6] Comments of David Nagle, president, AT&T Labs, quoted in Wired, online, Mar. 21, 2000.

[7] Teleconference with Daryl Chaires of Tellium (October 23, 2000); see also, e.g., information available from cable supplier Alcatel at www.alcatel.com.

[8] Id.

[9] See also "Operators of Fiber-Optic Networks Face Capacity Glut, Falling Prices", Wall Street Journal Oct. 19, 2000, page B1.

1. The Desk Top Study

The first step in route planning is referred to as the Desk Top Study. This is primarily a data search to evaluate potential landing points near the desired connection sites and apparently viable routes between them. It is common practice to visit the prospective landing points at this stage, and to begin communicating with local authorities and other users.

Selecting a new landing point and marine route typically includes consideration of environmental and other marine and land-based issues. Relevant environmental issues include environmental restrictions on land and the desirability of avoiding NMSs, known wrecks, reefs or other hard-bottom areas, and other identified environmentally sensitive areas. Other relevant marine issues include bottom topography (e.g., avoiding sewer outfalls, pipelines, slopes prone to rockslides, etc.) and competing uses (e.g., areas where trawling, dredging, or anchoring increase risks to the cable). Relevant land-based issues include the ability to connect to customers, either through an existing cable landing station or through constructing a new station and "backhaul" route (connecting the station to new or existing land-based, high capacity cable routes).

2. The Route Survey

After the route over the seabed is preliminarily laid out based on the desk top study and possible interactions with other users of the seabed, the cable owner uses state-of-the-art electronic survey equipment to map the details of the route. Typical data collected shows the nature and depth of sediment (rock/mud/coral etc.), as well as detailed depth contours. During the survey phase the company typically collects bottom samples by coring or grab-sampling. In the near-shore areas, this work is supplemented by a diver survey to identify any features or hazards. Cable engineers use the resultant maps to avoid areas of hazard or environmental sensitivity, such as rock or coral outcrops or canyon features.

3. Security and Maintenance Considerations

For security, modern cable systems often are built in a "ring" structure, so that if one leg is accidentally injured, the traffic can almost immediately be routed around the ring in the other direction with no disruption of service. This may result, for example, in two parallel routes across the Atlantic or the Pacific, each joined by north-south legs at the western and eastern ends. To reduce the chance of both trans-oceanic legs being injured by a common cause (such as a ship dragging its anchor), they customarily are placed tens to hundreds of miles apart. Another traditional spacing requirement comes from maintenance considerations. At least at depths not reachable by divers or a remotely operated vehicle ("ROV"), a cable that needs repair typically must be recovered by dragging a cutting grapnel and then a holding grapnel. To avoid such grapnels injuring another cable, such cables must be placed a distance apart from each other at least twice the depth of the water.[10] For this reason, a typical configuration of multiple cables landing at the same point is something of a fan shape; the cables leaving the shoreline spread further apart as the water depth increases.

NASCA presents these factual issues here because they affect the feasibility of the concept of corridors mentioned in the ANPRM. Corridors that would require clustering of cables without considering the above security and maintenance needs would create great risks for not only the cable owners and immediate customers but also the country as a whole. Submarine cables are a key component of the nation's critical telecommunications infrastructure. As such, their incapacity or destruction would have a debilitating impact on the defense or economic security of the United States. NOAA must consider such risks in developing any general policy regarding submarine cables and when considering any particular cable.[11]

4. Fishing Considerations

In many cases, the cable company communicates with commercial fishing interests at an appropriate stage of the planning process in order to minimize conflicts, since entanglement can be bad for both the cable and the fishing gear. When fishermen can provide specific data regarding their most productive grounds, numbers and types of vessels, and fishing methodology, route engineers can avoid or minimize interactions between the fishers and the cable. In some cases, fishers are invited to actively participate in the route survey and selection processes on board survey vessels. This proactive involvement ensures real-time resolution of routing issues.

Most of the time, the primary method of minimizing conflicts is through the cable company burying the cable under the seafloor, using a plow dragged behind the cable ship.[12] In several recently approved projects, burying to approximately 1 meter (3 feet) has been deemed sufficient to greatly reduce the probability of interaction with bottom-fishing gear.[13] However, the appropriate burial depth is affected by the type of bottom

---

[10] Attachment 2 (statement of Lawrence E. Hagadorn before the Division of State Lands and the Department of Land Conservation and Development of the State of Oregon (Oct.7, 2000), p.4).

[11] See Executive Order No. 13010 (July 15, 1996) (establishing commission for study of need to protect nation's critical infrastructure); Presidential Decision Directive No. 63 (May 1998) (directing establishment of a coordinated, national effort to protect the nation's critical infrastructures against natural disasters and intentional attacks that could significantly disrupt the delivery of services vital to the nation's defense, economic security, and the health and safety of its people).

[12] Other burial methods also are used. For more details, see e.g. Attachment 2 at p.5; Attachment 4 at pp. 2-13 to 2-15; Attachment 6 at pp. 4 to 6.

[13] Examples include California approvals of the China-U.S., Japan-U.S., Pacific Crossing, and Southern Cross projects; Oregon approval of the China-U.S. project; Washington approval of the Pacific Crossing project; and New Jersey approval of the 360 Americas and TAT-14 projects.

material as well as the type of fishing gear, and is limited by the potential need to be able to retrieve the cable for repair.[14]

Hard bottom areas generally preclude burial. Where the cable is laid across the hard bottom, certain kinds of fishing can be inhibited (since a fisher risks liability for injuring a cable). In that case it is particularly important to work with local fishers to try to adjust the route if necessary to minimize adverse economic impacts on them. For example, this was done in 1999 for the landing of the China-U.S. cable at Bandon, Oregon, which could not avoid crossing some rocky areas. It was also done that year for four different cable systems landing in California. In a cooperative effort among three different projects (China-US, Japan-US, and Southern Cross), the routes of five different cables converging at Morro Bay were adjusted in coordinated fashion, so all could cross the least amount of near-shore hard bottom. Further down the coast at Grover Beach, the Pacific Crossing system also adjusted its route to maximize burial and thus reduce impacts on local fishers, at an estimated cost of approximately $1 million.

5. Environmental and Cultural Resource Considerations

Cable routes typically are designed to minimize environmental impacts, including by selecting or modifying the marine route if necessary. For example, the rerouting of the California cable projects described above to avoid hard-bottom areas was also designed to reduce impacts on the more significant species there. Cable projects that must cross barrier reefs typically look for a sandy-bottom gap in the reef to pass thru, or at least a narrower or less-densely populated area of the reef.

Before finalizing the route, the cable company typically does a survey to determine whether any potential cultural resources of interest (shipwrecks, etc.) may be present in state waters. This typically is required as a condition of the U.S. Army Corps of Engineers permit. Any objects of potential significance are avoided through adjusting the route or, where avoidance is infeasible, are examined for cultural significance.

B. How Submarine Cable Systems Are Installed

As has been pointed out above, much effort and expense is expended in defining the appropriate route for the cable. Once this is done, the cable is typically plowed into soft bottom sediments (sands, silts or muds) of the continental shelf, where there is risk of contact with anchors or fishing gear. The depth to which a cable can be buried depends on the particular bottom conditions, currently available plow technology, and the potential need to retrieve the cable for repair. Note that telecommunications companies developed plow technology in an effort to reduce the interaction with fishing gear that, in the past, consistently broke or injured surface laid submarine cables. This plow technology has proven effective in protecting cables from fishing activity.[15]

---

[14] Attachment 2 at pp. 4 - 5.

[15] Shapiro et al., 1997, "Threats to Submarine Cables," presented at SubOptic '97, San Francisco.

In depths outside the operating limit of the plow, the cable is typically jetted in with a Remotely Operated Vehicle (ROV). Current state-of-the-art ROV technology used on the U.S. continental shelf generally can bury a submarine cable to a depth of 0.6 meters below the seabed (burial depth will vary dependent upon bottom sediment conditions, e.g., deeper burial is often achieved in softer sediments).

The cable is simply laid on the seabed in areas where no threats (such as from fishing) exist to submarine cables; in areas where crossing hard bottom cannot be avoided; and at depths beyond the ability of available plow technology. On areas of hard bottom where burial is precluded, the cable may be constructed with additional layers of armor, to protect the cable from external threats such as fishing or anchors. At depths beyond the reach of fishing gear that could threaten a submarine cable, there typically is no need to protect the cable via burial.

Historically, at the intersection of land and sea, a trench would be dug through the beach and near-shore area to allow burial of the cable up to the so-called beach manhole, the point where the submarine cable is anchored and where the transition to terrestrial cable is made. Although there are still some situations where trenching is appropriate, currently the most common method for bringing the submarine cable onshore is for the cable instead to be pulled through a directionally drilled conduit. In this method a drill rig is set up onshore and a mostly-horizontal hole is bored from a point onshore to a point offshore. The exit point will depend on local geology and topography, and will also take into account such things as the draft of the potential cable laying ship and cable landing methods. Use of the horizontal directional drill was adopted by the telecommunications industry in an effort to protect sensitive dune, beach and other habitats.

C. How Cable Systems Are Repaired

The only maintenance that submarine cables need is repair if they fail for some reason. In a few cases, submarine cables have failed due to some internal defect, such as in one of the electronic amplifier devices known as repeaters. However, most repairs are required instead because of some "external aggression", such as impact by an anchor or fishing gear. The attached affidavit by Lawrence Hagadorn describes the typical process of retrieving a cable for repair of a faulty section on-board the cable repair ship, returning the cable to the water, and reburying the cable if necessary.

III. SUBMARINE CABLE SYSTEMS HAVE MINIMAL ENVIRONMENTAL IMPACTS

The ANPRM gives us cause for concern because it includes a number of statements that would seem to make sense only if NOAA presumed that submarine cables typically have a significant adverse impact on the marine environment or commercial fishing, in NMS and elsewhere. The evidence is overwhelmingly to the contrary. Therefore, a major objective of these comments is to provide NOAA with copies of some of the most comprehensive government studies done regarding the environmental impacts of submarine cables, and to provide below a distillation of their findings.[16] These show that the environmental effects of modern submarine cables systems, and even the cumulative effects of multiple such systems landing in one area, are insignificant.

A number of states and territories have recently approved such projects after environmental and other review, including Washington, Oregon, California, Hawaii, Guam, the Virgin Islands, Puerto Rico, Florida, New Jersey, New York and Massachusetts. These projects have also been approved by the district offices of the U.S. Army Corps of Engineers ("ACOE"), after consulting as required with other federal agencies regarding their potential effects on the environment, fishing, and cultural resources. NASCA or its members could provide NOAA with the documentation of the government review and approval of each such project if desired. However, for present purposes, NASCA is providing NOAA with copies of the project-specific studies and related documents listed on Attachment 3. These were selected because they represent some of the most detailed and comprehensive analyses of the potential environmental effects of such projects.

Note that the studies listed in Attachment 3 are not just the opinion of the relevant project proponent. Instead, each Environmental Assessment, Environmental Impact Report, and Mitigated Negative Declaration listed there has been certified as final or otherwise approved and adopted by the relevant permitting agency. Similarly, the sample Essential Fish Habitat studies provided here have each been relied upon by the National Marine Fisheries Service ("NMFS") in responding to the ACOE request for consultation, and thus were part of the foundation for issuance of a permit by the ACOE.

The conclusions of these studies each address only a particular project. However, the conclusions are so consistent that they strongly suggest general characteristics of submarine cable projects as currently planned and implemented. The findings relevant to the ANPRM of these many studies of specific projects, as each was reviewed and approved by state and federal agencies, are summarized below:[17]

1) Impacts on biological resources would not be significant. In particular:

    a) Neither threatened nor endangered species would be adversely affected.[18]

    b) The cable-laying process will not threaten marine mammals.[19]

[16] Providing this factual information supports NOAA reaction #8 as listed in the ANPRM, in which NOAA recognizes that it should "collect information about existing submarine cable projects and the known environmental effects of installation and maintenance".

[17] The approvals granted to other recent submarine cable projects not covered by these listed documents, even if documented in less detail, are consistent with these findings.

[18] Attachments 4, 8, 13, 16, 18, 19.

[19] Attachments 4, 8, 13, 16, 19. Note that the failure of one of the major environmental studies referenced herein to specifically address one of the bulleted points above does not imply that the study reached a

c) Prior monitoring confirmed no adverse effects of cable-laying on sea otters watching the operation.[20]

d) There is no significant risk of whale entanglement from the proposed cables.[21]

e) The impact of plow burial on benthic organisms will be so limited and temporary as to not be significant.[22]

f) There will be no significant impacts from laying cable across hard-bottom areas (either because the project avoids those areas[23] or because the impacts of such crossing will be less than significant[24]).

g) There will be no significant impacts on managed fish and invertebrate species or Essential Fish Habitat.[25]

2) Air emission impacts will not be significant[26] or will be so short-term and localized as to be acceptable to the local jurisdiction.[27]

3) Water quality impacts will not be significant.[28]

4) The risk of significant impacts to cultural resources can be avoided by pre-installation seafloor surveys and minor route adjustments if necessary.[29]

5) Impacts on the commercial interests of fishermen could be mitigated so as to be less than significant through measures such as burial and/or route selection or adjustment based on discussions with those affected, and compensation for lost fishing gear.[30]

---

different conclusion. Rather, such studies differ somewhat in their level of detail, and often omit reference to an issue that does not seem to be a potential concern.

[20] Attachments 4, 8, 13.

[21] Attachments 4, 8, 13, 16, 18, 19.

[22] Id.

[23] Attachments 16, 18.

[24] Attachments 4, 8, 13, 19.

[25] Attachments 6, 9 (Appendix R), 12, 14.

[26] Attachments 4, 8, 13, 16.

[27] Attachment 19.

[28] Attachments 4, 8, 13, 16, 19.

[29] Attachments 4, 8, 13, 16, 18, 19.

6) These conclusions hold true equally even when the cumulative impacts were considered of five pre-existing cables plus ten new cables as part of six planned cable systems in the same area.[31]

CONCLUSION

Before NOAA proceeds further with this ANPRM process, we urge it to carefully consider the factual information provided in these and other studies. Similarly, NOAA should gain a more realistic sense of the likely pace of adding such projects (see Part I above) and an appreciation for how such projects already are designed with input and influence from a range of governmental and other parties (see Part II.A above). The evidence clearly demonstrates that current industry and government processes are fully protecting both the environment and the legitimate interests of other users of the seabed.

---

[30] Id.

[31] Attachments 4, 13, 16.

ATTACHMENT 1

Companies Participating in NASCA
as of October 23, 2000

360networks inc.

Asset Channels-Telecom, Inc.

Concert Global Networks USA LLC

FLAG Telecom Holding Limited

Gemini Submarine Cable System (UK) Ltd.

Global Crossing Ltd.

Global Photon Systems, Inc.

Level (3) Communications, LLC

Sprint Communications Company L.P.

Teleglobe Communications Corporation

WCI Cable, Inc.

WorldCom, Inc.