

**SUBMIT OPTION SUBMITTAL FORM BY:**

1. EMAIL TO: [COLORADORIVERBASINSTUDY@USBR.GOV](mailto:COLORADORIVERBASINSTUDY@USBR.GOV)

2. U.S. MAIL TO: BUREAU OF RECLAMATION, ATTENTION MS. PAM ADAMS, LC-2721, P.O. BOX 61470, BOULDER CITY, NV 89006-1470

3. FACSIMILE TO: 702-293-8418

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## Option Submittal Form

**Contact Information (optional):**

**Keep my contact information private.**

Contact Name: _____	Title: _____
Affiliation: _____	
Address: _____	
Telephone: _____	E-mail Address: _____

Date Option Submitted: \_\_\_\_\_

**Option Name:**

Water Imports Using Ocean Routes - Tankers
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**Description of Option:**

Tankers could be used to transport water from Alaska to southern California. System features for the tank option would include land-based or offshore loading and unloading facilities, a terminal shore reservoir, and pipelines to transport water to and from these facilities.
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**Location:** Describe location(s) where option could be implemented and other areas that the option would affect, if applicable. Attach a map, if applicable.

Rivers in southern Alaska and California
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**Quantity and Timing:** Roughly quantify the range of the potential amount of water that the option could provide over the next 50 years and in what timeframe that amount could be available. If option could be implemented in phases, include quantity estimates associated with each phase. If known, specify any important seasonal (e.g., more water could be available in winter) and/or frequency (e.g., more water could likely be available during above-average hydrologic years) considerations. If known, describe any key assumptions made in order to quantify the potential amount.

It is estimated that up to 1 million AF of water may be available for water export. The specific amount available will depend on the rivers used and the water rights agreements. The following four companies projected that they can convey the following quantities. Transglobal Trad = 1,000 AF/day or 365,000 AF/year Alaska Water Exports = 30,000 AFY Solar Sailor = 276-445 AF/day or 83,000 AFY to 162,000 AFY.
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## Additional Information

**Technical Feasibility:** Describe the maturity and feasibility of the concept/technology being proposed, and what research and/or technological development might first be needed.

Tankers are currently used in some areas to supplement local water supplies, thus demonstrating the feasibility of making bulk water deliveries using tankers.

**Costs:** Provide cost and funding information, if available, including capital, operations, maintenance, repair, replacement, and any other costs and sources of funds (e.g., public, private, or both public and private). Identify what is and is not included in the provided cost numbers and provide references used for cost justification. Methodologies for calculating unit costs (e.g., \$/acre-foot or \$/million gallons) vary widely; therefore, do not provide unit costs without also providing the assumed capital and annual costs for the option, and the methodology used to calculate unit costs.

Cost reported in 2007 is \$2,000-\$2,400 per AF. Cost adjusted to 2012 costs are \$2,300-2,800 per AF.

**Permitting:** List the permits and/or approvals required and status of any permits and/or approvals received.

The most significant permit required would be the water rights permit. The State of Alaska passed legislation in 1992 to facilitate water exports. If water were to be transported from northern California to southern California it would require approval from the State Water Resources Control Board and other agencies. Recent application to withdraw water from the Gualala and Albion Rivers in northern California, met with considerable opposition. The California Coastal Commission required that additional environmental studies be conducted, and the applications were withdrawn.

**Legal / Public Policy Considerations:** Describe legal/public policy considerations associated with the option. Describe any agreements necessary for implementation and any potential water rights issues, if known.

The specific amount available will depend on the rivers used and the long term water rights agreements that are made. Water transport from northern California rivers would have significant opposition.

**Implementation Risk / Uncertainty:** Describe any aspects of the option that involves risk or uncertainty related to implementing the option.

Water transport from northern California rivers would have significant opposition.

**Reliability:** Describe the anticipated reliability of the option and any known risks to supply or demand, such as: drought risk, water contamination risk, risk of infrastructure failure, etc.

Water from Alaska, transported by tanker, would be a reliable source of supply if long-term water rights agreements were made with the State and cities. In 1992, Alaska passed legislation that allowed for the development of its bulk and bottled water exports. Alaska owns 40 percent of the nations' free flowing fresh water and discharges are about 1 billion. The primary technical issues are fuel consumption.

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**Water Quality:** Identify key water quality implications (salinity and other constituents) associated with the option in all of the locations the option may affect.

Specific source rivers in Alaska have not been identified for transport via tanker. Most rivers in southern Alaska have generally good water quality although some have been degraded due to mining activities and some have heavy sediment loads.

It has been suggested that single hull tankers previously used to ship oil could be used to transport water. It would be extremely difficult to adequately clean the vessels so they could be used to transport potable water. Therefore, contamination issues are a serious concern. Using new single hulled tankers would avoid the contamination issues.

**Energy Needs:** Describe, and quantify if known, the energy needs associated with the option. Include any energy required to obtain, treat, and deliver the water to the defined location at the defined quality.

Energy Required	Source(s) of Energy
Fuel costs are a major expense for the tanker option.	Diesel fuel for the tankers

**Hydroelectric Energy Generation:** Describe, and quantify if known, any anticipated increases or decreases in hydroelectric energy generation as a result of the option.

Location of Generation	Impact to Generation
	No effect

**Recreation:** Describe any anticipated positive or negative effects on recreation.

Location(s)	Anticipate Benefits or Impacts
	No effect

**Environment:** Describe any anticipated positive or negative effects on ecosystems within or outside of the Colorado River Basin.

Location(s)	Anticipated Benefits or Impacts
	A primary effect is air emissions from tanker engines.
	A primary concern is the effect that water withdrawal would have on the biological resources of the area, particularly on anadromous fish population. There would also be the potential to have short-term adverse impacts associated with construction activities. The potential for transport of exotic or invasive species should be evaluated, if the imported waters were to be discharged into regional water resources. If new terminal storage facilities were constructed, this risk could be minimized.

**Socioeconomics:** Describe anticipated positive or negative socioeconomic (social and economic factors) effects.

No effect

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**Other Information:** Provide other information as appropriate, including potential secondary benefits or considerations. Attach supporting documentation or references, if applicable.