

## NPRB Proposal Summary Page

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(To be filled in by applicant)

**Project Title:** Response and Intervention System for Climate Change Induced Paralytic Shellfish Poisoning in Aleut Communities

**Project Period:** From May 2006 To September 2007

**Name, Address, Telephone Number and Email Address of Applicant:**

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**Research Priority and Subcategory:**

**Primary** 4.b LTK studies related to other RFP priorities  
**Secondary** 4.a Pilot project for community-based observation system

**Summary of Proposed Work** (250 words or less):

This proposal is aimed at educating local residents about paralytic shellfish poisoning (PSP) and training them to use test kits to monitor for PSP toxin. The project activities will include workshops, development of a manual on how to set up a community-based surveillance system, and public outreach materials. The proposed communities extend the length of the Aleutian Islands where little baseline data is available on PSP toxin. Since 1973, over 150 outbreaks have been reported in Alaska, with three fatalities since 1994. In an effort to reduce the risk of PSP encounters, the Alaska Science and Technology Foundation funded research to develop a rapid test kit proposed by Jellett Biotech in Nova Scotia, Canada, which was developed in 1994 and, in 2004, was approved by Food and Drug Administration, Interstate Shellfish Sanitation Program for screening shellfish, opening opportunities for communities to use a reliable, inexpensive method. The project PIs will investigate the increased risk of PSP as a result of climate change and the reliability of traditional knowledge used when harvesting clams and mussels. Methods developed to monitor occurrence and distribution of PSP toxins in connection with climate change observations will increase communities' capacities in responding to the threat of poisoning while developing the process of interlinking modern technology and traditional knowledge.

**Funding:**

Total NPRB Funding Requested: **\$150,000.00**  
By Institution:  
\$103,349.00 (Aleut International Association)  
\$46,651.00 (Aleutian Pribilof Islands Association)

Total Matching Funds Used: **\$0.00**

Legally Binding Authorizing Signature and Affiliation:

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1 **RESEARCH PLAN**

2 ***A. Project Title:***

3 Response and Intervention System for Climate Change Induced Paralytic Shellfish Poisoning in Aleut  
4 Communities

5 Short title: Paralytic Shellfish Poison Monitoring in Aleut Region.

6 ***B. Proposal Summary:***

7 This proposal is aimed at educating local residents about paralytic shellfish poisoning  
8 (PSP) and training them to use test kits to monitor for PSP toxin. The project activities will  
9 include workshops, development of a manual on how to set up a community-based surveillance  
10 system, and public outreach materials. The proposed communities extend the length of the  
11 Aleutian Islands where little baseline data is available on PSP toxin.

12 Since 1973, over 150 outbreaks have been reported in Alaska, with three fatalities since 1994. In  
13 an effort to reduce the risk of PSP encounters, the Alaska Science and Technology Foundation funded  
14 research to develop a rapid test kit proposed by Jellett Bioteck in Nova Scotia, Canada, which was  
15 developed in 1994 and, in 2004, was approved by Food and Drug Administration, Interstate Shellfish  
16 Sanitation Program for screening shellfish, opening opportunities for communities to use a reliable,  
17 inexpensive method.

18 The project PIs will investigate the increased risk of PSP as a result of climate change  
19 and the reliability of traditional knowledge used when harvesting clams and mussels. Methods  
20 developed to monitor occurrence and distribution of PSP toxins in connection with climate  
21 change observations will increase communities' capacities in responding to the threat of  
22 poisoning while developing the process of interlinking modern technology and traditional  
23 knowledge.

24 ***C. Project Responsiveness to NPRB Research Priorities or identified project needs***

25 This project responds to the NPRB research priority of Local and Traditional Knowledge (4b.  
26 LTK studies related to other RFP priorities) in that it provides for the development of the  
27 complementary relationships between conventional science and traditional knowledge aimed at  
28 the improvement of communities' well being through creation of a community-based  
29 observation and response system and incorporates the six ways identified in the science plan that  
30 LTK can contribute to the NPRB's mission:

- 31
- 32 • Generating research hypotheses
  - 33 • Documenting existing LTK
  - 34 • Recording observations
  - 35 • Fostering collaborative analysis
  - 36 • Collaborating on specific projects
  - 37 • Exploratory research

38 ***D. Project Design and Conceptual Approach***

39 **Hypothesis**

40 The potential for occurrence of paralytic shellfish poisoning (PSP), as a result of climate change,  
41 is a growing health concern to the Aleut communities. Subsistence users rely on their local knowledge to  
42 determine whether it is safe to consume shellfish. Increased variability of weather and extreme events,  
43 especially in the transition months in spring and fall make it difficult to correctly identify the time frame  
44 for gathering shellfish. Traditional knowledge is based on the times of seasons and not temperature.  
45 While information, based on traditional knowledge, helped document and validate the changing climate;  
46 these changes often render some traditional knowledge that people rely on for subsistence insufficient.  
47 Supplementing traditional knowledge with conventional scientific research through a complementary  
48 approach will increase communities' adaptive capacities. Educating residents about the causes and  
49 training them to monitor shellfish toxicity in addition to traditional observations will help them to identify  
50 the potential threat and reduce the threat of PSP poisoning.

### 51 **Primary Objective**

52 The project will develop methods for communities to monitor occurrence and distribution of  
53 toxins in connection with climate change observations and will increase communities' capacities in  
54 devising a mechanism to better respond to the threat and minimize the risks of poisoning. We will provide  
55 this information in the context of local and traditional knowledge.  
56

### 57 **Background**

58 The recently released Arctic Climate Impact Assessment Scientific (ACIA) Report focused on the  
59 changes that climate models predict will occur in the Arctic as a result of climate change over the next  
60 century (ACIA 2004), shows that these changes, which have already begun, will have significant  
61 environmental, economic, social and cultural affects in the Arctic (Wright et al. 2000).  
62

63 A key finding of the ACIA report is that Arctic species' diversity, ranges, and distribution are  
64 changing. Observations indicate range changes are already happening on a large scale. A review of 143  
65 studies involving range distributions of nearly 1,500 species indicated that 80 percent had shifted their  
66 ranges toward the poles (Root, et al. 2003). These shifts are likely to be greater in Polar Regions where  
67 the temperature increase has been greater.

68 Status of human health is defined by interaction of complex genetic, nutritional, and  
69 environmental factors that include social, economic, cultural, and ecological systems, all of which are  
70 impacted by climate. For example, increased prevalence of a disease-causing organism, due to its  
71 distribution shift, is an indirect result of climate change. Greater occurrence of infectious diseases creates  
72 a stress on population as opportunities for subsistence harvest are decreasing and traditional foods are  
73 becoming unsafe (ACIA, 2004).

74 Arctic residents will be facing higher impacts of health-related climate change issues than the  
75 residents of the contiguous United States. Many Arctic residents live in small isolated communities that  
76 depend on subsistence harvest that do not have efficient public health support systems. They are more  
77 likely to suffer from illnesses, injuries and even fatalities as a result of the loss of an important source of  
78 cultural support, such as traditional food.

79 In addition, vulnerability of indigenous peoples in the Arctic is even higher due to the  
80 combination of factors mentioned above and unique connection to the natural environment and  
81 dependence on its resources. Alaskan Natives, as active subsistence users of marine resources, are  
82 particularly at risk of PSP because no toxin monitoring program is in place to assess their harvests.

83 Climate change models project continuation of the warming of sea water in the Arctic and the  
84 shift of southern species north. Some of these species are harmful algal blooms (HAB). Algal blooms are  
85 a worldwide problem that is increasing in frequency and intensity, causing severe episodes of illness,  
86 death, and economic hardship (RaLonde 2000). In Alaska the most damaging HAB is *Alexandrium*  
87 *dinoflagellate* blooms that cause paralytic shellfish poisoning (PSP).

88 PSP fatalities date back to 1799 when the crew of Alexander Baranof of the Russian American  
89 Trading Company ate contaminated blue mussels at the now notorious Poison Cove in southeast Alaska  
90 (Fortune 1989). Since 1973 over 150 outbreaks have been reported. The Alaska Division of

91 Epidemiology estimates there has been a seven-fold increase in PSP events since 1973. Three fatalities  
92 have occurred since 1994, the most recent on Kodiak Island in 2002. PSP has been observed on beaches  
93 near some Aleutian Island communities, and informal accounts show increases in the occurrence of PSP.  
94 Testing for PSP has focused on commercial shellfish operations in southeast and south-central Alaska  
95 (RaLonde 1996).

96 In 1997-98, reported PSP illnesses occurred on Kodiak Island, the Alaska Peninsula, and near  
97 Juneau. In 1997, nine cases of illness occurred resulting in one death. Although most PSP illnesses  
98 happen during the summer months, the season for toxin conditions appears to be expanding. In the spring  
99 of 1999, another death occurred on Kodiak Island, and an illness requiring emergency attention was  
100 reported in February 2000. The alarming aspect of reported PSP illness is that the state Department of  
101 Epidemiology estimates that the actual number of illnesses may exceed reported incidences by 10-30-fold  
102 (Gessner and Schloss 1996). Gessner (1996) also estimated that coastal Alaska Native populations are  
103 11.6 times more likely to encounter PSP than the Caucasian population because of their greater reliance  
104 on subsistence gathered seafood.

105 Despite the threat of PSP encounters, recreational and subsistence fisheries for bivalve shellfish  
106 are active throughout Alaska. The official policy of Alaska Department of Environmental Conservation  
107 (ADEC) is that no recreationally harvested shellfish are safe to eat except those harvested from certified  
108 beaches. The only certified beaches are located in lower Cook Inlet and Kachemak Bay where  
109 commercial fisheries and shellfish aquaculture sites are regularly tested. These areas are used by nearby  
110 Native communities, but such certified areas are not available in the Aleut region.

111 Past efforts to address the PSP problem and the lack of prevention policy have focused on public  
112 education through the Alaska Sea Grant Marine Advisory Program, research on new PSP toxin testing  
113 techniques, genetic studies to determine molecular mechanisms within the toxic algae responsible for  
114 toxin production, and utilizing new molecular probe technology to detect the presence of toxic algae in  
115 the water (Plumley 2000).

116 This program has a serious shortcoming. Since Alaska does not have an agency responsible to  
117 monitor recreational/subsistence harvests for marine toxins, the cost of sampling and testing shellfish  
118 must be paid for by the harvester. With limited staff at the ADEC laboratory, recreational/subsistence  
119 samples are low priority since the lab has a statutory responsibility to test commercially harvested product  
120 first. Consequently, a subsistence harvester may need to wait several days for the results of a sample test.  
121 The Jellett kit could possibly resolve this problem by making analysis available locally. The use of this  
122 technology needs to be tested locally to determine if it is practical.

123 To protect recreational and subsistence harvesters, the State of Alaska invested in the  
124 development of the Jellett PSP Rapid test kit in 1998 (Maurice et al. 2000). Through three iterations of  
125 improvement, the test received final approval in 2003. (In addition to the final kit approval process, the  
126 Alaska Sea Grant Marine Advisory Program is coordinating a study to test the accuracy of field testing by  
127 untrained harvesters collecting shellfish samples, splitting the sample, field testing one sample, and the  
128 split sample being confirmed by the ADEC laboratory.) In this project, the approval of the Jellett PSP  
129 test kit presents an opportunity to conduct community-based cost-effective additional field studies that  
130 have not been possible earlier.

131 An important research outcome is to determine the potential impact that use of shellfish testing  
132 could have on traditional diets. The MIST kit is very sensitive and could produce false positives resulting  
133 in less use of shellfish in an otherwise healthy traditional diet.

134 A sample of a project using the Jellett MIST™ kit (Cembella, R. R. 2000) conducted at the  
135 village of Chenega during the summer of 2003 by the Alaska Sea Grant Marine Advisory Program is  
136 shown on Table 1.

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Table1. Paralytic shellfish toxin testing Results from selected locations in Alaska using the Jellett Bioteck Rapid Test Kit.

Sample Location	Species	Date / Time Tested	Results
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O'Brien Creek, 50 meters S of mouth	Butter clams	8/28/03	10 a.m.	Toxins Present
O'Brien Creek, 50 meters S. of mouth	Littleneck clams	8/28/03	1 p.m.	No toxins present
S. Long Beach, sand spit near rocks	Butter clams	9/10/03	9 a.m.	Toxins present
S. Long Beach, sand spit near rocks	Butter clams	9/10/03	9 a.m.	Toxins present
Mouth of O'Brien Creek	Softshell clams	9/11/03	11 a.m.	No toxins present
Mouth of O'Brien Creek	Softshell clams	9/11/03	11 a.m.	No toxins present
Kasaan Bay	Butter clams	4/05/04	11 a.m.	Toxin present
Ouzinkie Island	Butter clams	7/15/03	1 p.m.	Toxin present
Ouzinkie Island	Littleneck clams	7/15/03	1 p.m.	Toxin present
Smuggler's Cove Annette Island	Butter clams	10/10/03	3 p.m.	Toxin present
O'Brien Creek, 50 yds S. of mouth	Littleneck clams	9/26/03	11:30 a.m.	No toxins present

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Global warming and climate change make use of traditional knowledge to identify toxic shellfish unreliable. With no state agency having resources or authority to monitor beaches for PSP in bivalve shellfish, and ADEC statutory authority to certify only commercially farmed and harvested shellfish, a substantial number of coastal Alaskans are susceptible to PSP. Toxin levels and distribution of PSP in western Alaska bivalve species harvested for subsistence is not known. Preliminary studies in 1977 revealed mixed results with drag samples of surf clams (*Spisula polynyma*) showing undetectable levels while great Alaskan tellin clams (*Tellina lutea*) and cockles (*Clinocardium nuttalli*) tested positive for toxin, primarily in the visceral mass (Hughes et al., 1978a). Studies in 1978 found toxin in samples, but registered below the 80 ug/100 gram limit required by FDA. However, visceral tests registered from 13-234 ug/100 grams (Hughes and Nelson 1978b). Clearly, very little information is available on PSP levels in intertidal bivalves harvested for subsistence consumption in western Alaska, and harvesters face unknown risks of illness.

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There is a need to test for PSP throughout the Aleut region to determine the extent of the toxin in subsistence foods in these untested areas and to establish a baseline to help detect any change in prevalence of PSP as a result of climate change. Development of a baseline of presence of PSP in the Aleut region is important. The prevalence of PSP events could increase in number and duration as a result of climate change. Aleut region communities may be experiencing higher occurrence of contamination of shellfish now or in the very near future. This project will provide an assessment of the practical application of MIST kits for local use. It is important to include the Commander Islands in this study to collect comprehensive data on the distribution of PSP toxin in the region that will help project researchers to provide more accurate recommendations to the communities and health authorities in Alaska.

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**Objectives**

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1. Educate the citizens of selected communities in the Aleutian and the Commander Islands on the oceanography processes that produce PSP plankton blooms, associated toxicity and their relation to climate change and traditional observations.
2. Educate bivalve harvesters about the relative risk of encountering PSP from their harvest and the difference in species of bivalves and harvesting and processing methods to reduce risk of illness.
3. Train tribal/village environmental coordinators and health clinic staff in use of the Jellett PSP test kit and identification of risks and symptoms of PSP.
4. Perform baseline assessment at selected locations in the Aleutian and Commander Islands to determine occurrence and potential range expansion as a result of climate change and to compare collected data with information based on traditional knowledge.
5. Confirm field test results with the Jellett Biotech laboratory.
6. Provide Alaska Department of Environmental Conservation and Health Department of the Kamchatka Regional Administration with collected PSP monitoring data that may encourage these government agencies to develop additional surveillance programs and advisories to consumer of traditional foods.

177 7. Develop informational materials for community outreach that will provide practical recommendations  
178 for protection against PSP.  
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180 **Approach**

181 The activities will be based on the principles of collaboration, transparency, and inclusiveness.  
182 Principle investigators, representing Aleut International Association (AIA), Alaska Sea Grant and a  
183 regional non-profit, Aleutian Pribilof Island Association (APIA) will team with environmental  
184 departments of the Tribal Councils in the Aleut region, State Nature Reserve Kommandorsky and the  
185 community of Nikolsoye (Commanders, Russia), in planning the education and training effort. Training  
186 will be conducted by University of Alaska Sea Grant Marine Advisory Program (MAP) and APIA staff,  
187 which has extensive experience in PSP education and monitoring. Use of village coordinators will be  
188 necessary.

189 The project will make good use of past research data and tools. In Alaska, the team will build on  
190 the project experience of the IGAP (Indian General Assistance Program) participants, research on  
191 traditional food safety (Dietary Benefits and Risks, administered by the Aleutian Pribilof Island  
192 Association, NIEHS grant) and environmental departments in the tribal offices. In Russia, participants  
193 with experience in the current and former projects implemented by AIA in Commanders will join the  
194 team. This will enable effective cooperation with project researchers and ensure responsiveness from the  
195 communities.

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197 **Testing and Monitoring**

198 Testing and monitoring the intertidal bivalves for the presence of PSP will be conducted in a  
199 systematic sampling program at multiple locations for a variety of species and different tissues within the  
200 shellfish (e.g. gonad, visceral mass, muscle, mantle etc.) to determine PSP extent and distribution. Co-PI  
201 and project coordinators from selected communities will create a timeline and protocols for sampling that  
202 will be used in communities. The research methodology will comply with established protocol formats set  
203 by the Alaska Native Science Commission.

204 Thus far, limited testing has been conducted on the surf clam (*Spisula polynyma*). At least 150  
205 samples per year will be tested with the Jellett Rapid Test kit and a quality assurance test performed by  
206 Raymond RaLonde, from MAP, will require an additional 50 test kits/yr. In addition, the QC sample will  
207 be sent to Jellett Bioteck for confirmation of results using HPLC.

208 Data on ocean temperature will be collected at each sampling location using HOBO  
209 water temperature loggers. Ocean temperature data may be a useful indicator of climate change  
210 at the regional level and may correlate to PSP events in Nikolskoye, Commander Islands. Data  
211 collection will be supervised by Nikolai Pavlov, a Russian researcher. AIA coordinator based in  
212 Nikolskoye will serve as liaison with the community and local government. Data collection related to  
213 population health is controlled by the regional and federal authorities in Russia. AIA will correlate  
214 Russian government requirements and the project research protocols to assure consistency and  
215 comparability of collected data and possibility of information sharing. This will strengthen the existing  
216 ties between AIA and Kamchatka regional Health Department and will open doors for other joint research  
217 activities necessary for long-term monitoring, assessing, and addressing environmental changes, such as  
218 climate change in the North Pacific Ocean.

219 The geographical area for the project was selected to provide more accurate information on the  
220 distribution of toxin. The proposed communities are Sand Point/King Cove (Eastern Aleutians),  
221 Nikolski/Atka (Western Aleutians), Nikolsoye (Commander Islands, Westernmost Aleutians), and St.  
222 George (Pribilof Islands, central Bering Sea). Resolutions of support from each partner Tribe are attached.  
223

224 **Data Management**

225 The data from this project will be compiled by the lead Co-PI at each location and checked for  
226 accuracy and precision by MAP. The PSP data will be housed with the communities' environmental

227 offices, APIA Community Services Department and Alaska Department of Environmental Conservation,  
228 the public health decision-maker responsible to protect human health and Health Department of the  
229 Kamchatka Regional Administration. The temperature data will also be compiled at the communities and  
230 be made available to government, university researchers, and national and international monitoring and  
231 observation initiatives. The data will be available to a wider audience by including it in ADEC's Alaska  
232 PSP and marine water temperature database.

233 The data collected from this project will be useful at local, regional, national and international  
234 levels. Thus local expertise will provide valuable contributions to the state and national decision-makers  
235 in addition to the communities directly affected by a potential outbreak of PSP. However, the data from  
236 the standardized questionnaires, developed with input from local experts, will be made available if  
237 communities determine that collected information is not sensitive to subsistence resources distribution.  
238 Otherwise, only comparative statistics will be released.

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### 240 **Community Outreach**

241 The Tribes will be directly involved with the project through participation in the Steering  
242 Committee (described below), monitoring activities, providing data and assisting in the development of  
243 educational materials that are culturally and locally relevant.

244 Results of testing will be provided to communities in a written project report. The report will be  
245 delivered to the participating communities' Tribal and city Councils in Alaska and to the local  
246 municipality in Nikolskoye. Environmental coordinators will present the information to the Tribal  
247 Councils and city councils. They may also choose to hold a community meeting or include the results in  
248 a newsletter. Community workshop/meetings will be organized to inform people about project activities  
249 and explain why they are important, to ask for feedback and, if applicable, to record people's concerns  
250 and, thereby involve the community, exchanging ideas and insuring that the project is carried out in a way  
251 that the community supports. A manual and informational brochures will be written and distributed to  
252 communities on how to structure a community PSP monitoring program to complement local knowledge.  
253 Other materials (booklets and posters) on preventive measures will be developed based on communities'  
254 recommendations. The project will be used to demonstrate how conventional science can be used to  
255 supplement traditional knowledge and why employing both ways of knowing can yield the best results.  
256 Materials will be disseminated to local schools, health centers and clinics, libraries, local organizations  
257 and placed in public areas. Appropriate materials will be translated in Russian for dissemination to the  
258 public using similar venues. AIA coordinator in Nikolskoye will be responsible for information sharing in  
259 Russia. The final report will be presented to communities on site and via teleconferences

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### 261 **Linkages**

262 This project will be tied with other activities in the region related to climate change, traditional  
263 food safety and indigenous knowledge. The monitoring activities will be integrated when possible with  
264 current and developing programs of the Aleut International Association:

- 265 1. The developed process of complementary rather than alternative use of traditional knowledge and  
266 conventional science will be replicated and further enriched in other relevant projects.
- 267 2. The monitoring system created as a result of this project will be a valuable contribution to the  
268 development of and an integral part of the Bering Sea Sub-Network (BSSN) – an alliance of  
269 coastal community-based research and monitoring stations, a concept supported by the Arctic  
270 Council and submitted to the International Polar Year Committee and the Circumpolar  
271 Biodiversity Monitoring Programme (CBMP) of the Arctic Council's Flora and Fauna Working  
272 Group

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### 274 **Project Activities**

- 275 1. A project Steering Committee (SC) will be organized at the onset of the project to assist in  
276 guiding the project activities and to be a clearinghouse of information. This group will consist of

- 277 project PIs, three tribal environmental coordinators and one representative from each: AIA,  
278 ADEC, and ADPH. The SC will decide on the best ways to involve local residents for sampling.  
279 2. The PIs, with assistance of local environmental coordinators, will organize and lead workshops  
280 coordinated with local health departments in the communities. Videoconferencing will be  
281 employed where possible.
- 282 a. At the workshops the MAP collaborators will address the problem of proper  
283 identification of the bivalve species. Two major issues that must be addressed at the  
284 workshops are proper identification of the bivalves at harvest and the distribution of toxic  
285 shellfish on a beach. Identification of shellfish species is a problem in that the littleneck  
286 clam (*Protothaca staminea*) and the butter clam (*Saxidomus gigantea*) retain and  
287 depurate toxin very differently. Butter clams retain toxin at high levels for as long as two  
288 years, while the littleneck clam generally has lower concentrations and depurates faster.  
289 The community harvesters will help researchers to confirm species of the various  
290 bivalves in their harvest areas and which species to avoid and/or test. The PIs will co-  
291 instruct the classes and test students to insure they have met the educational objectives.
  - 292 b. At the workshops the PIs will address sampling techniques. The designated local  
293 samplers will be trained how to use the Jellett PSP test kit, compile and maintain the data  
294 in the community, and send copies the data to the PIs. We will train 2-3 members per  
295 community to do the species identification and sampling using the Jellett Rapid Test kit,  
296 and how to identify symptoms and maintain a health-based PSP exposure register.
  - 297 c. Testing for PSP will occur twice per week from June 15 to September 30 for a maximum  
298 of 12 sites.
- 299 3. The local samplers will compile and maintain the data at the community's environmental office  
300 and send a copy of the data to Bruce Wright, a Co-PI. The samplers will collect and send samples  
301 (twice per sampling period) to RaLonde, at MAP, for a Quality Assurance test.
  - 302 4. The local coordinators will record assessment of harvest safety based on traditional knowledge of  
303 local users at the same locations and times as Jellett PSP testing for comparison. The coordinators  
304 will use standardized questionnaires developed with input from local experts. If communities  
305 determine that collected information is sensitive to subsistence resources distribution, only  
306 comparative statistics will be released.
  - 307 5. Upon receipt of the final results of testing and monitoring, the SC will develop recommendations  
308 for a manual design and necessary public outreach materials.
  - 309 6. PI and Co-PIs will draft materials that will be reviewed and approved by the SC.

### 310 311 **Expected Results/Benefits**

- 312 ■ The project results will be of direct benefit to the participating communities by providing them  
313 with an effective management plan and necessary skills to address their concerns of possible  
314 increase of PSP. The communities will have established PSP subsistence food monitoring  
315 programs and PSP toxin surveillance system in the Aleutian and Commanders Islands. The data  
316 collected from this project will open up a communication channel with state regulators and will  
317 provide local expertise for long term application for food safety monitoring. Use of the Jellett  
318 PSP test kits will provide accurate information about subsistence foods and help protect people  
319 from exposure to PSP in remote areas where health care services are limited. The results from the  
320 PSP tests may reveal the possibilities of opening local-based commercial fisheries for bivalves.
- 321 ■ The project activities will advance the development of the interface of western science and  
322 traditional ways of knowing strengthening the understanding that both are needed to enhance  
323 human knowledge.
- 324 ■ Other coastal communities will have an indirect benefit from access to the data, the process of  
325 establishing the monitoring system, and final products, such as a manual or brochure.
- 326 ■ The governments will be better equipped with data on PSP necessary to develop policies and to  
327 secure funding for surveillance and testing necessary to protect human life.

- 328       ▪ The project will establish a direct information exchange channel between authorities and
- 329       communities that will allow government to act in a timely manner and develop proactive
- 330       measures.
- 331       ▪ Participating communities will gain experience in devising adaptive measures to combat climate
- 332       change impacts.

333  
334 **Deliverables:**

- 335       ▪ Data in electronic and print form
- 336       ▪ Manual for set up of community-based PSP surveillance
- 337       ▪ Illustrated guide on bivalve species
- 338       ▪ Final report to communities

339  
340 **General project Information**

341  
342 **Timeline of activities and milestones**

344 <b>2006-07</b>	344 <b>Month</b>	344 <b>Lead</b>
345       Meeting of Steering Committee	345       May	345       Gofman and Wright
346       Contact village councils	346       May	346       Gofman
347       Determine village samplers	347       May	347       Gofman and Wright
348       Organize workshops	348       May	348       Gofman and Wright
349       Purchase Jellett Rapid Test kits	349       May	349       RaLonde and Wright
350       Workshop in Sand Point	350       June	350       RaLonde and Wright
351       Workshop in St. George	351       June	351       RaLonde and Wright
352       Workshop in Atka	352       June	352       RaLonde and Wright
353       Workshop at Nikolskoye (Commanders)	353       June	353       RaLonde and Wright
354       Draft manual and other materials	354       October-April	354       RaLonde, Wright, Gofman
355       Present paper Alaska marine science workshop	355       January	355       Wright
356       Review PSP lab data	356       April-May	356       RaLonde
357       Final Report	357       August 2007	357       Wright

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359  
360 **Historical and Geographical Specifics of the Selected Region**

361       The Aleutian archipelago of over 200 islands stretches westwards for 1400 miles from the

362       terminus of the Alaska Peninsula towards the Kamchatka Peninsula of the Russian Federation, separating

363       the Bering Sea and the Pacific Ocean. The Aleut people have been living a maritime lifestyle for

364       millennia. In 1741, Russian merchant explorers began the exploitation of the natural resources and the

365       Aleut people. Alaska was claimed as part of the Russian Empire.

366       Aleuts were moved to the previously uninhabited Pribilof Islands to accommodate increased

367       demands for more furs in 1786 and to the Commander Islands in 1824. In 1825 the permanent settlement

368       of Nikolsakoye was established on Bering Island with an Aleut, Russian and Creole population moved

369       from villages in the Aleutians.

370       In 1867, the United States purchased Alaska. The Commander Islands were not included in the

371       sale and the Aleut population was not relocated to their home islands. Nikolskoye became an

372       administrative center and the Commander Islands became a part of the Kamchatka Region of the Russian

373       Empire, later the Soviet Union, and today is part of the Russian Federation.

374       Today, there are 10 Aleut communities in the Aleutian and Pribilof Islands region. The 2000 U.S.

375       census reports the regional population as 8,162 people, including 2,200 Aleuts. In Russia, there are over

376 300 Aleuts on Bering Island and over a hundred on the mainland. In both the Aleutians and the  
377 Commander Islands, the economy and subsistence of the Aleuts remains tied to the sea as it has been for  
378 centuries; today many Aleuts exist by commercial fishing and subsistence activities. In Russia, the  
379 Bering Island Aleut community plunged into an economic downturn after the subsidies disappeared with  
380 the collapse of the Soviet Union. Nikolskoye village on Bering Island is one of the smallest, most remote  
381 and inaccessible municipalities of the Russian Federation.

382 Since the early 90s, most of the territory of the Russian Far East, including the Commander  
383 Island, became open for foreign visitors providing an opportunity for international researchers to extend  
384 their activities to include this area. An ecosystem approach requires cooperation across the borders.  
385 Inclusion of the Commander Islands in any research in the Aleutians and the Bering Sea enhances quality  
386 and reliability of collected data, ensures that environmental situation on the Russian side is assessed. This  
387 will improve protection of the Bering Sea region shared by the United States and the Russian Federation.  
388 For the Aleut people of Alaska and Russia, this cooperation has even greater significance. It unites once  
389 divided people in protection of their home and environment that sustains their culture.

390

### 391 **Quality Assurance Statement**

392 The QA and QC aspects will be completed by RaLonde and Wright, Co-PI's.

393 Both aspects of this project must be considered for quality assurance. The educational component will be  
394 based and tested on behavioral objectives. Students must meet the behavioral objects of being able to use  
395 the Jellett Rapid Test kit, obtain expected results, document the results and describe the procedure of  
396 maintaining and disseminating the results. Those who do not meet these objectives will not become  
397 samplers.

398 To prevent illness and/or loss of life from ingesting PSP contaminated recreational and  
399 subsistence harvested marine foods, the State of Alaska invested in the development of the Jellett PSP  
400 Rapid test kit in 1998. Through three iterations of improvement, the test received final approval in 2003.  
401 The test kits will continue to be evaluated, but this is a separate program which the PIs will monitor for  
402 changes in the Jellett Rapid Test kits and their use. In addition to the final kit approval process, the Alaska  
403 Sea Grant Marine Advisory Program is coordinating a study to test the accuracy of field testing by  
404 untrained harvesters collecting shellfish samples, splitting the samples, field testing one sample, and the  
405 split sample being confirmed by the ADEC and Jellett laboratories. The results from these tests will be  
406 incorporated into the proposed project to insure accurate and precise results.

407 The PIs will also conduct a field test on the surf clams. At least 50 samples will be tested with the  
408 Jellett Rapid Test kit and a Quality Assurance test performed by Raymond RaLonde. In addition, the QC  
409 sample will be sent to Jellett Biotech laboratory for confirmation.

410 The data from this project (field sampler results and field test results) will be compiled by the  
411 lead Co-PI, checked for accuracy and precision, and provided to ADEC for inclusion in their Alaska PSP  
412 database. Water data loggers will be deployed in the ocean near each participating community. The data  
413 loggers will be collected by the PIs and the data will be recovered. The marine temperature data will be  
414 maintained by the PIs and provided to the community samplers.

415 None of the data from this project will be proprietary or restricted. The data will be made  
416 available to ADEC and other state, university, and federal agencies. These organizations will be contacted  
417 directly. However, the data will be made available at Alaska science meetings as well, particularly the  
418 annual Science Symposium held in January in Anchorage, Alaska.

419 Samples will be collected and handled as described in the documents accompanying the Jellett  
420 Rapid Test kit. These procedures have been standardized by ADEC for handling samples for use with the  
421 Jellett Rapid Test kit and their testing using the mouse bioassay test.

422

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470

471 **E. Project Management**

472 The Aleut International Association (AIA), 333 W. 4<sup>th</sup> Avenue, Ste. 301, Anchorage, AK 99501, 907-  
473 332-5388, 907-332-5380 (fax), [aia@alaska.net](mailto:aia@alaska.net), will provide general project management. AIA office will

474 monitor project progress and maintain information on all project participants and activities. Victoria  
475 Gofman, PI, will also be responsible for assuring community stakeholders' meaningful participation,  
476 public relations, and compliance with local requirements for research and data collection. Project  
477 planning will be collaborative effort of the Steering Committee facilitated by PI. Co-PIs are responsible  
478 for assuring scientific merit of the research. Specific responsibilities are identified in the attached  
479 contract. Day-to-day coordination of local activities will be managed through Environmental Tribal  
480 Offices in Alaska and AIA coordinator in Nikolskoye. Anchorage-based AIA project assistant will work  
481 with PI.

482 Communication between all participants will be coordinated by AIA. In Alaska, we will utilize  
483 monthly regional teleconferences organized by the Aleutian Pribilof Islands Association for  
484 Environmental Coordinators. Communication with AIA office in Nikolskoye via e-mail and telephone  
485 will be facilitated by AIA.

486 AIA was created in 1988 by the Aleutian Pribilof Island Association (APIA) (U.S.) and the  
487 Association of the Indigenous Peoples of the North of the Aleut District of the Kamchatka Region of the  
488 Russian Federation (AIPNADKR). It was incorporated as an Alaska Native non-profit, 501 (c) (3), and  
489 established its headquarters in Anchorage, Alaska. AIA is governed by the Board of Directors comprised  
490 of four Alaskan and four Russia's Aleuts under the leadership of a president.

491 AIA's mission is to establish close ties with the Russian Aleut community and the Russian  
492 Northeastern regions; protection of the shared environment, preservation of cultural heritage, and  
493 strengthening good-neighbor relations; engaging in international activities aimed at improvement of the  
494 Arctic environment; and advocating for the indigenous peoples' interests in the Arctic. AIA has been an  
495 active player in developing bilateral relations between the State of Alaska and the Kamchatka and Koryak  
496 Regions of the Russian Federation.

497 In 1999, AIA was admitted as a Permanent Participant in the Arctic Council. In 2005, AIA was  
498 granted Special Consultative Status with the Economic and Social Council of the United Nations. As an  
499 international organization with a political presence in global northern affairs, AIA is well suited for the  
500 role of a facilitator in the regional programs development and implementation.

501 As a Permanent Participant of the Arctic Council, AIA actively participated in the Arctic Climate  
502 Impact Assessment report and contributed to the policy document on climate change negotiated by eight  
503 Arctic states in consultation with six indigenous peoples' organizations that have seats in the Arctic  
504 Council.