



**“ In The Pink”
Community Guidelines for
Net Pen Rearing of Pink Salmon**



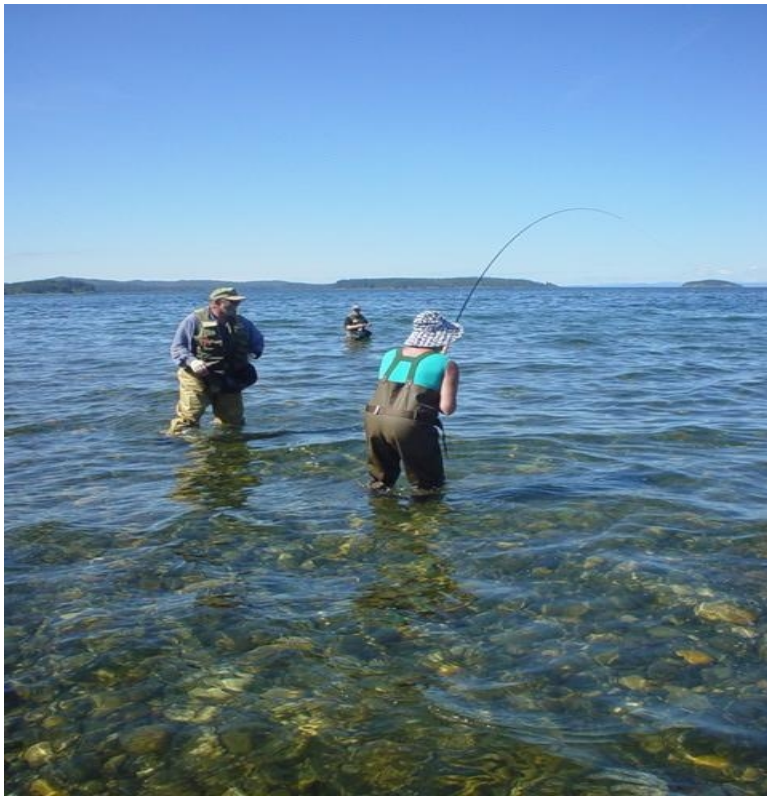
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1. Project Objectives



- To bring smiles to anglers in the Strait of Georgia.
 - To revitalize fishing opportunity with expectation of catch in the Strait of Georgia.
 - To encourage new anglers, and to catch the interest of children, hoping they become lifelong anglers.
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- To provide a fishery that is in sheltered waters, close to home, with easy access from small boat, fishing pier, or shore.
 - To promote community involvement with Salmon, from the rearing stage, stewardship activities, to harvest opportunity, by empowering that community to play an active role in the whole process.



Method



By utilizing floating net pens moored in approved locations to rear Pink Salmon Fry for 3 to 4 weeks before release to open waters.

2. Background

Discussions in the recreational fishing communities have grown about the decline in opportunity with the expectation of catch in angling within Georgia Strait. There has been a large decline in the number of anglers and young entrants as other salmon species have declined and fishing areas closed. Although many anglers and organizations have joined forces in working on habitat

restoration projects, and supported many small enhancement facilities, local returns of coho and chinook in sustainable numbers simply have not occurred in most areas.

The Province examined how recreational angling could be stimulated and a new focus was placed on a new generation of fishers. They commissioned a series of reports; the first was to explore what might be done to increase opportunity and expectation, the corner stones of recreational angling. Then, two other reports focused on those activities and investments which could be the most effective, be undertaken locally, and easily delivered with high probability of success. The rearing and release of pink fry using net pens to provide easy access fisheries in and around communities surrounding Georgia Strait, was identified as one of the best ways to increase local fishing opportunities and encourage new anglers to participate in the sport.

Pink salmon offer an easy catch, convenient access in safe and sheltered waters, and provide an experience children can enjoy and remember. Fishing for pink is fun! Because returning pinks school in large numbers, and travel close to shore as they approach their natal areas, they can be caught casting from shore, or from local docks. The pink salmon ocean rearing strategy allows Fisheries Managers to have the ability to open select areas to fishing that otherwise would remain closed, while bringing the fun back into fishing, and reconnect the community to the pleasures of a healthy outdoor family activity. It also increases tourism activity and quality fishing for fly fishers along accessible beaches.

RECOMMENDATION: Community Pink Salmon Projects

First Steps

Two people are available to help guide the process:

1. A Provincial Ministry of the Environment, Ocean & Marine Fisheries Branch , Pink Salmon Net Pen Initiative community liaison:

Martin Paish

3rd Floor North; 2975 Jutland Rd.

Victoria, BC

V8W-9N1

Ph: 250-953-3422; Fax: 250-953-3401

email: Martin.Paish@gov.bc.ca

2. A Federal Department of Fisheries and Oceans Community Advisor (CA) for your area:

South Coast Area Community Advisors

Dave Davies - Central portion, east coast of Vancouver Island and adjacent mainland inlets
148 Port Augusta Street Comox, BC V9N 7Z4
Tel: 250-339-0431 Fax: 250-339-4612

[view projects supported by Dave](#)

Car: 250-338-3325
Email: daviesd@pac.dfo-mpo.gc.ca

Barry Cordocedo - Central west coast of Vancouver Island, east to Nanaimo, south to Chemainus
3225 Stephenson Point Rd. Nanaimo, BC V9T 1K3
Tel: 250-756-7263 Fax: 250-756-7020
Email: CordocedoB@pac.dfo-mpo.gc.ca

[view projects supported by Barry](#)

Tom Rutherford - Lower Vancouver Island, including the southern Gulf Islands and Cowichan River watershed
Box 241-5653 Club Road, Duncan, BC V9L 3X3
Tel: 250-746-5137 Fax: 250-746-8397
Email: RutherfordT@pac.dfo-mpo.gc.ca

[view projects supported by Tom](#)

Grant McBain - Sunshine Coast and Howe Sound, Port Mellon to Desolation Sound
Box 10 Madeira Park, BC V0N 2H0
Tel: 604-883-2613 Fax: 604-883-2152
Email: McBainG@pac.dfo-mpo.gc.ca

[view projects supported by Grant](#)

Barry Peters – Campbell River Area, Oyster River to Tsitika River and adjacent Mainland Inlets
150 - 1260 Shoppers Row
Campbell River, BC V9W 2C8
Tel: (250) 286-5823 Fax: 250-286-5852
Email: PetersB@pac.dfo-mpo.gc.ca

[view projects supported by Barry](#)

Both the Provincial Representative and Federal Community Advisor will be enormous help in getting the project underway.



3. What is involved in putting this project together?

a. Organization, Consultation with Community Advisor

- A group or society (the sponsor) would need to sponsor and raise the necessary funds to build and set up, maintain and operate a temporary net pen. This would need to be a long term commitment to put the program on annually over a number of years.
- Local First Nations people would need to be consulted, and support found for the local project as planned. These meetings need to be planned with your community advisor.
- This commitment requires the support in principle of a Municipal or City Council, along with the authority, if it is in or on Municipal or City property or lease, to set up and maintain a net pen. Local parking and site use may be under their jurisdiction. Where they have the authority, this means also including ensuring access for the public to fish for the salmon upon their return.
- Various sources of funding can be considered. Local community events which would also serve to advertise the venture, local or other levels of government can be petitioned, or application to funding organizations, such as the Pacific Salmon Foundation, or British Columbia Conservation Foundation. These organizations will usually consider funding material costs if the local groups supply the labour and transport.
- This sponsor group would need to locate and evaluate a net pen site, using the guidelines and criteria provided following this section in the manual. The Province of BC has undertaken preliminary site identification in a variety of communities. Contact the Provincial Pink Salmon Net Pen Initiative community liaison for further information about a possible site in your community.
- The sponsor would have to seek all necessary approval by a variety of regulatory bodies, Federal and Provincial. In some cases Municipal government or Regional Board policies and regulations may apply. More details on this process follow in this manual. Some of the authorities, such as a Port Authority, Parks Branch either Provincial or Federal, or Harbour Commission may also be involved.
- The sponsor would need to apply to the Pink Salmon Net Pen Steering Committee for project approval in principle, found at the back of this manual, showing they are able to meet the general required criteria outlined in this handbook.
- The sponsor would have to engage the support of the local DFO Community Advisor, who could be aided by the Provincial coordinator, to plan site location, establish procedures for transport of eggs, incubation of eggs, and rearing of fry to size ready to out plant, transport of fry, and care and feeding, and follow required application process for approval from the DFO Transplant Committee.
- Once project approval is received in principle, an application would have to be made to the Federal-Provincial Introductions and Transfer Committee, who will then review the site selected and the egg rearing process before providing approval. This process normally takes 3-5 weeks. So the application needs to be submitted as soon as possible after a decision is made to install a net pen.

- Establish a fishing plan, considering and consulting with the area Fisheries manager on areas (which may require specific boundaries, openings in regulation variation) gear type (may need single barbless hook designation) or specific time / date. This is done in conjunction with the local area DFO Fisheries manager, with help from the DFO Recreational Fisheries Coordinator, Bill Shaw (250-756-7152).
- Consider actual fishing activity in the designated areas, as past experience at other venues has suggested need to look at safety in casting lures, possible jigging activity, competition for room on pier or wharf.
- When the sponsor group is ready, they need to apply to the Steering Committee for eyed egg allocation. This needs to be done with the detailed, final approval form in the back of this manual.

b. Egg Acquisition, Rearing

- Make sure that the hatchery which has undertaken to incubate the eggs and alevins to swim up has the appropriate substrate based incubators (preferable to Heath Trays) and temperature control to have fry come out for transfer to pens no sooner than last week March or first week April. It is very important not to put the fry out too early in the year, as they need to have the plankton blooms in Georgia Strait to feed on when released. This timing of egg growth and alevin emergence is controlled by ATU's, or temperature over time, (Accumulated Thermal Units) which is why the hatchery you are using needs to have cold water temperature control.
- The sponsor would drive to the source hatchery, pick up the eyed eggs, and within a few hours transport them to the facility that is best equipped to carry on the incubation of eggs through hatch and swim-up. Several options exist with regards to how to complete this process. Check with your local Community Advisor to see which options are best suited for your project.
- When Pink fry are ready, (yolk sac has been absorbed and they are naturally emerging from incubator), experienced people with the proper equipment need to be found to transport the fry to the net pen. Fish culturists will then need to calculate feeding schedules and arrange for the care and feeding of the pen. The hatchery may be able to help with special transport truck and hose.
- A time for release needs to be planned. This can be from two to four weeks after fry are placed in the net pen.

c. Requirements for Establishing a Temporary Net Pen Site

- Protected water for 3 to 4 weeks of moorage and easy access to feed and care for growing fish. Consideration for safety of those feeding the fry.

- Each prospective site should be sampled for biological requirements as close to (or during), the rearing period as possible. For Pinks, this would be March and April.
- Visual observations of flushing and debris loads during various tides (logs, sticks, seaweed, algae).
- Salinity: Minimum 25 parts per thousand (full strength seawater is around 32ppt)
- Temperature: Minimum 8 C, maximum 15 C for optimum growth and reduce risk of Vibriosis disease.
- Dissolved Oxygen: Minimum 8 parts per million (ppm) for good growth. This must be measured every couple of days when fish are in the pen.
- Velocity: For small fry, it is recommend that nothing be considered where the velocity is over 10 cm/second (measured with no pen) for sustained swimming speeds. With a small mesh pen in the water, the inside velocity will be substantially reduced, with the maximum sustained swim speed recommended being no more than one body length of fish per second (2 cm/second, pers.com. with Support Biologist Brian Anderson). This can be determined with an orange and a stop watch. Throw the orange in the water at peak tidal flow and time its travel distance with the stop watch.
- This is not a “true” science, so velocity must be eye-balled when fish are in the pen to ensure that they are not constantly swimming hard and have no areas or periods of rest. The bottom line is that you want enough flow to flush the pen and exchange water and oxygen, but not enough to cause fry to work excessively.
- Minimum depth of 5 meters at lowest tide if the depth is over 20 meters, no survey of bottom habitat need be undertaken.
- There must be no eel grass meadow or understory kelp under the net pen.
- Consider the need for protection from possible vandalism, or close supervision of the site.

d. Regulatory Considerations

- Permission for parking and access to the site from land owners or administrators. This may involve the local community government or municipality, the local harbor authority, or the local land owner (if on private property).
- If the Net Pen is to be placed in an estuary, most on the Island are controlled by an Estuary Management Committee who would need to grant approval. Your DFO Community Advisor will be aware of who to see in your community.
- Contact the Ministry of Environment’s Environmental Protection Division at: 250-751-3100. Once you notify them of the specifics of your project, they will direct you

with regards to waste management and other environmental considerations associated with your site.

- Contact the Provincial Crown Lands Office at: 250-751-7220. If you are locating your site on vacant crown land, tenure may be required. In any case you may wish to consider applying for tenure for your project in order to secure your site over the long term.
- Check to see if Provincial or Federal Parks Branch is affected by site or fishing plans.
- It will be a much simpler and less time consuming process to utilize an existing dock or marina that meets the biological criteria discussed later in this guideline for the placement of your net pen. You are encouraged to attempt to locate such a site within your community.
- Compliance with Navigable Waters Protection Act, Sec. 5.1, .2, now administered by Transport Canada.
 - Before you start your project, contact the nearest [NWPP Office](#) in your area to discuss in general terms the construction of the work you are proposing to build. During your discussion, ask if the body of water is considered "navigable".

Pacific Region	Regional Manager Navigable Waters Protection Program Transport Canada Pacific Regional Office 820-800 Burrard Street Vancouver BC V6Z 2J8 Phone: 604-775-8867 Fax: 604-775-8828
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The Navigable Waters Protection Officer will assist you in determining what information and documentation is required for preparing and submitting an application under the NWPA. Once you have finalized the project design, submit your application to the nearest NWPP Office. Include the details regarding the applicant (either you or your agent), the nature of the work, other approvals obtained, property ownership and drawings and plans of the proposed work.

For new construction, we will review your application either as a "formal approval" or by the "work assessment" process. The formal approval process is followed when the work has the potential to **substantially interfere** with navigation. The work assessment process is followed when NWPP officials determine that the work **does not** substantially interfere with navigation.

The work assessment process takes less time to complete, and does not require formal advertisement or an environmental assessment.

An "Approval" issued under the NWPA authorizes the work only in terms of its effect on navigation and it remains the owner's responsibility to obtain other approvals that may be required. Therefore, early in the planning stage you are encouraged to contact your local conservation authority, provincial Departments of Natural Resources, Environment, Fisheries and municipal offices to discuss their requirements.

- You may be required to do an Environmental Assessment of your project. Your Community Advisor will assist with this step if necessary.

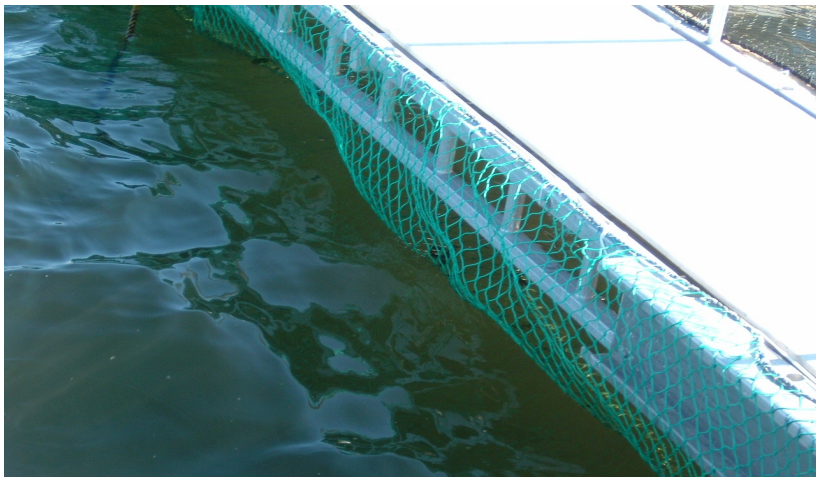
4. Construction of the Net Pen



This is the "Rolls Royce" of net pens with a welded aluminium frame measuring 12 ft. x 12 ft. inside (16 ft. x 16 ft. outside). An important feature is the railing support around the non-skid deck. More typically, a relatively inexpensive net pen will consist of 2 x 12 in. plank frame with foam floats sandwiched between 1/2 inch plywood deck and bottom (more durable for transport than suspending floatation below frame but pen will be lower in water) and measuring 10 ft. x 10 ft. inside (14 x 14 ft. outside). Note bird netting stretched across the top and moveable wind-up automatic feeder on aluminium rods in centre.

Net frame plans, material list, and assembly instructions for a 10 ft. x 10 ft. (inside dimensions) net frame are available from a netting company. Budget \$2000 for pen frame material costs.

For a typical 10 ft. x 10 ft. pen, the green, 2-inch polypropylene predator bag measures 14 ft. x 14 ft x 12 ft. deep (add 6 inches to width of each side of net to go around frame easily) and is fastened to outside of pen frame (usually with a 14 ft. piece of 1 x 3 screwed to the frame at 12 inch intervals). The 1/8 inch mesh fry bag is 10 x 10 x 10 ft. deep and is fastened to the inside of the pen frame in the same manner. The net bag has rib lines (usually 1/2 in. braided rope) around the top and from top to bottom on all four corners. Weights (approx. 20 lbs.) are attached to each bottom corner of both net bags.



These net bags and the bird netting, constructed to order, are available from commercial suppliers. Budget about \$1500 for all three items combined for each net pen. Your CA will provide you with the name of the supplier(s) in your area. Consideration should be given to a removable wire mesh top (secured to a wood frame) as an alternative to bird netting if otters or other critters are a potential problem. Build in two 5 ft. x 10 ft. sections and install perpendicular to the feeder rods for removal when refilling the feeder.



The \$350 wind-up "automatic" feeder is filled each morning after the fry are "hand fed" and will continue to release food for several hours.

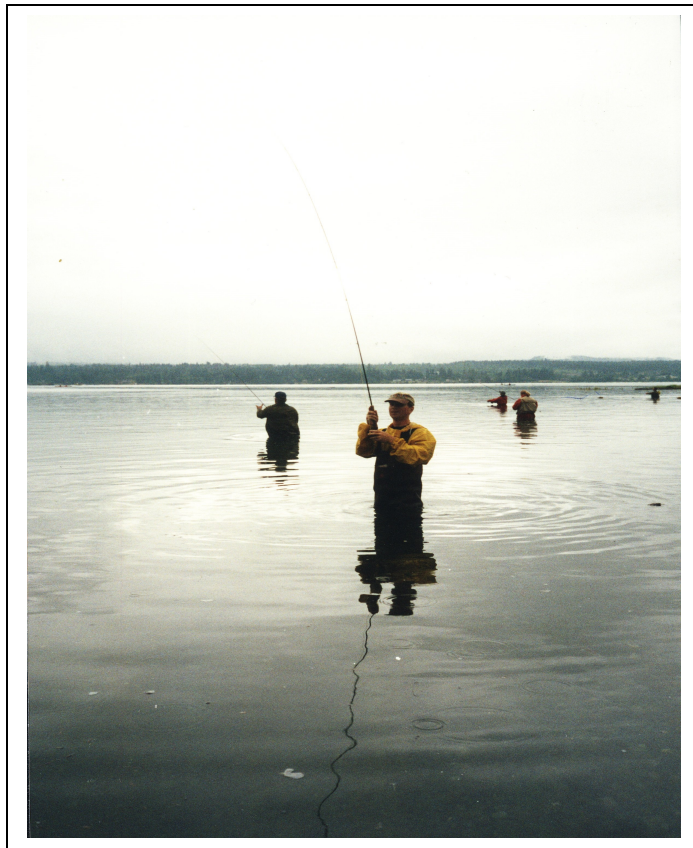
Wood frame net pens are constructed in four modules hinged together at the eight corners (4 inside and 4 outside) with pins or bolts. Custom made stainless steel hinges (16) and bolts with locking nuts are recommended but mild steel hinges with stainless or galvanized bolts and pins are much less expensive and will suffice for a few years if checked annually for corrosion. Bolts securing outside hinges to the plank frame should include an eye bolt for attaching tie-up ropes.

Blue polystyrene blocks, made for marine floats, are available from Industrial Plastics and cost about \$125 for each 10 in. x 20 in. x 96 in. long block. You will need 4 of these blocks for each net pen. The blocks are cut in half (48 in. lengths) and secured between the top and bottom plywood decks towards each end of the 2 x 12 planks with 2 x 4 cross braces (construction hint. Secure floats against bottom plywood deck before installing top plywood deck to ensure maximum floatation of pen above sea surface).

Net pen maintenance and storage would have to be planned, and the transport of it to and from the site.

5. Operational Guidelines

- Personal safety is paramount. Don't work alone and wear a personal floatation device (PFD) when working over water. Refer to the guidelines listed in WorksafeBC.com.
- Pink fry must be transported by experienced people using very specific tanks that are designed to accommodate very small fish, (every crack and hole needs to be caulked. Openings fully sealed and valves modified to ensure fry are not trapped in void spaces). It may be necessary to contact one of the Vancouver Island Hatcheries and negotiate the use of a tank truck with long hose to transfer fry from truck to net pen. They are set up for this sort of thing, with necessary lengths of hose. May be available if one pays for the gas for the trip.
- Once in the net, every second day, the Dissolved Oxygen (D/O) must be measured inside and outside the net, not at the surface. It is critical to be at 6 ppm or greater, inside the pen. If you see it getting low, water can be pumped from the outside to the inside, or a "bubbler" can be set. If you cannot supply oxygen to the water, and D/O reduces to 5 ppm, then you must release the fry.
- Feeding is done by a morning hand feed during inspections, followed by an automatic feeder being refilled and operated through the day. This feeding regimen was used by Nanaimo, and saw healthy fry ready for release in 4 weeks. However, in Campbell River, they hand feed during the day every hour, and then use an automatic feeder to cover the daylight periods when hand feeding is not done and the fry are ready in 2 ½ weeks. They feel this is a better feeding schedule as there is less risk to the fry when released early. Consult your Community Advisor or local hatchery as to which feeding regiment will work best for the location and feed type you are using.
- Check with the local DFO Hatchery or the Community Advisor to see which brand of feed has the needed ingredients each year, as the make up changes year to year by brand. Be sure to order it at least 1 month in advance, allow \$ 100.00 per bag. Probably need 3 to 4 bags. Your local Community Advisor or Hatchery staff can assist you with the calculations of feed required.
- A general rule of thumb for raising the fry is to double their weight. If they reach 0.5 grams, then they are ready to go. Depending on the feeding regime you are able to set up, this could take anywhere from 2 to 4 weeks. The longer you keep the fry in the net pen, the greater the risk of the fish getting overly stressed and contracting disease. You need to be aware of the possibility of these factors, which are indicated by a growing number of "morts" or dead fish. Diseased living fish may also appear lethargic, and swim up against the net at the edges of the pen.



6. Check List for Application Process

a. Approval in Principle

Step	Project	Date completed
1	Determine general requirements and overview from the manual of what is entailed in the project.	
2	Contact the local DFO Community Advisor to discuss your group's concept and vision of the project.	
3	Contact the Provincial Liaison, Martin Paish, for help in process if required.	

4	Check with CA to contact donor hatchery to determine if eggs are available.	
5	At a meeting of the sponsoring group decide who will be supporting the project and outline the work and funding requirements. Decide if it is viable for a long term commitment and elect / appoint contact people.	
6	Use application form, " <u>Application for Approval in Principle Only</u> ", at the back of this manual, to determine if it is worthwhile to proceed further.	

b. Site criteria and approval processes

Step	Project	Date completed
7	APPLY TO THE DFO INTRODUCTIONS AND TRANSFER COMMITTEE FOR PERMISSION TO MOVE EYED EGGS AND TO RAISE THE FRY IN YOUR PROPOSED SITE AND RELEASE TO PROPOSED AREA. THIS ANNUAL PROCESS MAY TAKE UP TO 6 WEEKS. IF THIS IS APPROVED THEN YOU CAN PROCEED WITH THE FOLLOWING STEPS:	
8	Contact the Provincial Liaison, Martin Paish, for help in process if required.	
9	Have your Community Advisor contact your local First Nations Community to ensure they are informed of the project.	
10	Contact the local Municipal or Regional governments to seek their support in principle. This would also involve any permission for access, both for the net pen, parking, and fishing access which may be under their jurisdiction.	
11	Check the site requirements as described in this manual, and perform necessary tests under the direction of the CA to ensure that the site meets the given criteria, both physical and biological.	
12	If required apply to Ministry of Transport, Navigable Waters Protection Act, (directions in this manual) for approval to put a net pen in your proposed site.	
13	Determine where the public access area for fishing would	

	be, and ensure that this is legally available to the public. Make sure the fishing area is not going to damage critical sensitive habitat.	
14	The CA will arrange a meeting with the appropriate DFO management, enforcement and assessment staff to develop a fishing plan in a specific, designated area.	
15	Contact the Ministry of Environment Environmental Protection Division to inform them of your proposed project.	
16	Apply to Provincial Government for permission to place a net pen in a particular foreshore lease or water lease, if necessary. This might also include Harbour or Port Authority, possibly Estuary Management Committee.	
17	Check to see if Provincial Park or Federal Park Branches are involved with either site area, or fishing area, and seek approvals required.	
18	Use the application form, “ <u>Application for Pink Salmon net Pen Project Approval</u> ”, at the back of this manual, for final approval application.	

c. Final Approval process

Step	Project	Date completed
19	Upon receiving the final approval for your project application, arrange for a hatchery to incubate the eyed eggs and alevins until ready for out planting (fry swim-up).	
20	Have experienced transport team and proper equipment to move green or eyed eggs from the donor hatchery to the secondary incubation facility by mid September.	
21	If building net pens (instructions in this manual) then have ready for mid March at latest.	

22	Order fish food at least 1 month in advance. Volume needed will depend on the number of fry to feed and target size at release. Contact local Hatchery staff or Community Advisor for help in calculating the amount needed.	
23	Have a fry transport system and team ready to go by first week of March.	
24	Have feeding and maintenance team organized and ready to go by first week of March.	
25	After release of the fish have all equipment cleaned and stored as appropriate.	



7. Pink Salmon Net Pen Steering Committee

a. Application for Approval in Principle Only

Group name:

Contact person(s):

Phone:

e-mail:

Mailing Address:

- 1) Please attach photo(s) and map of proposed site, fishing area including access points. Please indicate water depth at low tide, shelter from wind, safety from marine traffic, method of mooring net pen.
- 2) Please attach a brief written description of the proposed project which includes:

The name of the local government which would be involved, expectations for approval, where fishing would take place, and what permission process you expect will be involved to have this pen site, and public access.

Please include a rough estimate of cost, and expected funding sources.

Please indicate where egg supply may come from, and where those eggs would be reared. Please indicate if your area is one which the DFO transplant / Transport Committee is likely to approve for the expected egg source.

Please indicate which DFO Community Advisor you will be working with, and any technical help you may require.

b. Application for Pink Salmon Net Pen Project Approval

Group name:

Contact person(s):

Phone:

e-mail:

Mailing Address:

- 1) Please attach a clear photo and map of site, fishing area and access points.
- 2) Please attach copies of:
 - Letter from local government for your area in support of this project.
 - Letter from land owner, foreshore lease holder where net pen will be situated.
 - Letter of authorization for access to site for mooring, feeding and maintenance of net pen.
 - Where applicable, documentation from Transport Canada authorizing moorage of net pen.
 - Letter of support from local first nations who may be affected by the net pen and/or project.
 - Letter of authorization for fishing access, or photo / description of public area where fish will school on return.
 - Letter from a Fisheries Biologist or DFO Community Advisor confirming that biological and physical requirements for site have been met.
 - Letter from DFO Transport / Transplant Committee approving use of eggs/Pink Salmon from donor hatchery to your area for rearing and release.

- 3) Please describe costs identified, and funding sources secured to cover those costs.
- 4) Please describe the arrangements for daily feeding and release.
- 5) Please describe arrangements for eyed egg transport, rearing facility, and fry transport.

8. Important Dates to Remember

July 21 is the deadline for submitting the above final application form. This needs to be reviewed by the Steering Committee and a decision will be made by August 1. The reason for the urgency is to get your application request queued with the donor hatchery egg collection planning process. This will give them adequate time to ensure your egg request is met.

Make sure you have completed the check list in Section 6 along with the necessary approval forms.

Good Luck.