

## **Appendix A**

### ***Preservation Assessment of Totem Poles***

**Preservation Assessment of Totem Poles  
Totem Bight State Historical Park  
Ketchikan, Alaska**



**May 11-21, 2008  
Ron Sheetz, Conservator**

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## Introduction

The park collection consists of 16 totem poles, three of which are incorporated into the clan house. Twelve of the poles are of the Civilian Conservation Corps (CCC) era, late 1930s early 1940s. The more recent poles are the Land Otter Pole carved in 1996 by Nathan Jackson; Man Wearing Bear Hat carved in 1995 by Israel Shortridge; Thunderbird/Whale carved in 1990 by Nathan Jackson and the Halibut Pole carved by Nathan Jackson in 1970. The top bear figure on Kat's Bear Wife was carved in 1985 by Israel Shortridge. The CCC area totems were carved by native carvers in the CCC program, under the direction of a head carver for the project.

Some of these older poles are generally in better condition than I would have expected, located in the wet climate of Ketchikan. One advantage is the majority of the totems are out in the open where they can dry out. Most likely Permatox B, a fungicidal solution recommended in the 1930s and 40s by the US Forest Service's Forest Products Lab, was applied to the totems. Also it was probably applied during the intervening years. This solution contained the fungicide pentachlorophenol and probably borax and paraffin wax as a water repellent. Also, other wood preservatives have been applied to the poles over the years. In August of 1993, Borate rods were inserted around the base of pole #3 Man Wearing Bear Hat; #5 Pole on the Point; #6 Blackfish Pole; #7 Land Otter Pole; #8 Master Carver; #9 Sea Monster Pole; #10 Raven at the Head of Nass; #11 Kat's Bear Wife; #12 Kadjuk Bird Pole; #13 Halibut Pole and #14 Thunderer's Pole.

Park Ranger, Mary Kowalczyk's 1994 condition survey for the totems at Totem Bight are valuable documents that help track the condition during the intervening years. It describes at that time the urgency for treatment, etc. She also was very helpful in keeping things running smoothly and even operated the lift on Saturday. With assistance from Project Manager, Mike Schroder who ran the lift while he was there and Becky Bentley, Natural Resource Technician who operated the lift the remainder of the condition assessment also helped make the project flow very well. The only hitch was two nasty afternoons of 40 degree weather with the wind blowing the rain sideways. Needless to say we shut the lift down. When Becky wasn't operating the lift she and Carey Crawford were cutting back the encroaching vegetation of tree limbs and underbrush.

On the 20<sup>th</sup> Tuesday, Chris Degernes, Chief of Field Operations and Jo Antonsen, Office of History and Archeology of Alaska State Parks, were able to see firsthand the problems associated with the totem poles. We toured the park and I was able to point out the more serious problems of each pole. We used safety as the primary factor for lowering the first three poles, Halibut Pole, Pole on the Point, and Blackfish Pole. In time, all of the CCC era poles will

have to come down for treatment or replicated due to fungal decay. In order to keep the park running, only several totems will be lowered at one time.

## **Totem Bight State Historical Park Recommendations for Continued Conservation and Maintenance**

To help minimize future degradations of the totems, I would recommend that the objective of the work on the poles be the preservation of existing materials rather than restoring to a previous appearance. Focus on slowing the rate of deterioration from fungi, insects and the environment. Repainting of the poles should be avoided unless the original paint design is known. Also the borate preservatives will not penetrate through paint. When the water repellent is applied it will enhance the old paint on the totem. If for aesthetics, the totems are to be painted, first apply the paint, as the good water repellents are paraffin oil based and paint will not adhere over them. You may consider a stain, instead of paint, which will not leave a film layer like paint, for moisture to be trapped under. The carving of missing elements should be performed by native carvers familiar with the art form. The filling of cracks and voids is usually counterproductive. Small fissures inevitably form between the fill and surrounding wood allowing water to penetrate. This water is often trapped within the pole, which promotes fungal decay.

The following specific recommendations will help prolong the life of the poles significantly but will not preserve them indefinitely. These wooden totems exposed to the climate of Southeast Alaska will ultimately deteriorate to a point beyond being erected. If they are to be preserved for the long term than they will require an enclosed, (preferably climate controlled), exhibit or storage space.

Wooden artifacts, subject to an outdoor environment, require continual cyclical maintenance. The maintenance should include periodic removal of vegetation and the re-application of a fungicide and water repellent. The initial preservation treatment should be undertaken by an experienced preservation specialist. The cyclical maintenance tasks can be accomplished by the park personal once they have been trained in the necessary techniques. Park Ranger, Mary Kowalczyk is familiar with the procedures used at Sitka NHP and is very capable of performing these tasks.

The preservation work will require a man lift. Scaffolding could be used for shorter poles. A crane will be needed to lower and re-erect the poles. An enclosed building, (long enough for the tallest totem and wide enough to house several totems at a time), will have to be built to house the lowered poles for storage and treatment. Several chain hoists will be required to lift and rotate the totems. The totems can be moved around on carts if the building is built with a

concrete floor. **Note:** Once a totem is lowered it will have to be protected from the elements. It should at least be placed under a shelter until it can be housed in an enclosed building. A totem laying horizontal, is much more subjective to deterioration from the elements!

### Remove Vegetation

Remove the underbrush from around the poles by cutting or with weed killer, preferably in a radius of 15 feet. The trees and branches that overhang the totems should be cut back. They can create a potential for damage to the object. This work was being performed each day that I was there by Becky Bently, Natural Resource Technician, and Carey Crawford of the ACC, and is a task assigned to them for the summer. I can vouch that the brush grew several inches after being cut just during the preservation assessment project.

Note: Do not remove roots which have grown into the poles, simply clip them at the surface. Removal can damage the decayed wood.

### Control Fungal Decay and Insect Infestation

The application of fungicides and water repellent over the years has done much to keep most of the poles in a relatively stable condition. However, plant and lichen growth on the surface and the presence of decayed wood indicates that application of a fungicide is necessary.

First remove the vegetative and lichen growth using brushes, wooden scrapers and water. All debris from falling tree leaves, needles, should also be removed. If available an air compressor works well to blow the debris out of the cracks and crevices in the totems.

A sodium borate based product called Bora-Care has been used on the Sitka NHS totem preservation project. This product has proven to be effective as a fungicide and insecticide, yet has very low toxicity to humans or animals. One major advantage is that it diffuses into the wood and can reach deep pockets of decay. A disadvantage is because it is hygroscopic it will leach out over time. For the totems at Sitka a four to five year reapplication is working out well. Application can be done by spray or brush or both. Using a brush to work it in on the end grain surfaces is an advantage. Park Ranger, Mary Kowalczyk applied both Bora-Care and X-100 Natural Seal water repellent to the totems at Totem Bight State Historical Park in 2003.

A good water repellent should be applied over the borates. We have used X-100 Natural Seal, a paraffin oil based material which has good retention qualities, a higher percentage of solids, and a lower percentage of solvent than most water repellents. The X-100 Natural Seal can be purchased with a mildewcide which prevents the surface growth of certain fungi that are not affected by Bora-Care. Another good water repellent is TWP 500 Series water repellent which has much the same characteristics as the X-100.

The CCC era totems are approximately 80 years old. It amazes me that after being buried almost 80 years the bases on most of the poles do not show the deterioration that you would expect. More deterioration may show once the pole is lowered. I would suggest testing the density of the base of each pole with a "Resistograph" or similar instrument. The resistograph uses a very fine drill bit 20" long which gives graphic chart readings as it penetrates the wood. The bases of the lowered totems that are stable enough to be re-erected should have a fungicidal wrap, such as Cubor Wrap, applied around the base from the grade line to a depth of about 18 inches in order to prevent further decay. The wrap, is impregnated with copper naphthenate and borates.

The totems in which the bases are too deteriorated for re-erecting will have to be placed on support post of metal or wood. The backs of totems with decay will have to be carved out, removing the decayed wood. When re-erected on support post they should be set up off the ground four to five inches to prevent wicking of moisture from the ground.

### **Reattach Loose and Separated Elements**

All loose joints should be secured. The repair if possible, should duplicate the original method. In some cases additional mechanical means may be necessary to provide more structural stability. Some of the mortise and tenon joints can best be repaired by patching in new wood, while some joints and other loose and separated elements can be reattached with a flexible epoxy adhesive. Where the edges do not mate well, the epoxy can be bulked up with micro balloons and fumed silica to make a more paste like consistency. The decayed wood of the poles exhibited outside should be consolidated with low viscosity epoxy resin.

### **Attaching metal Caps**

All of the totems with exception of the several that have a well made cap need to be capped. Either copper or sheet lead can be used. I prefer sheet lead as it is more easily formed over different shaped surfaces of the totems. The caps will repel water and they also act as a deterrent to decay fungi. Also, birds such as the raven don't like to land on metal as well as wood. The heaviest accumulation of vegetative growth is usually located on the upper portions of the totems, and is probably being well fertilized by bird droppings.

### **Sources of supplies**

Bora-Care; Impel Rods; Epoxy and Water Repellent  
TWP, P.O. Box 2160, Kirkland, WI 98083, Tel. 1-800-827-3480

X-100 Natural Seal Water Repellent  
ABR, 9720 South 60<sup>th</sup> Street, Franklin WI 53212, Tel. 1-800-346- 7532

## Individual Preservation Assessments

Of Totem Poles Totem Bright State Historical Park

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## 1. Thunderbird and Whale: Carved 10/13/1992 by Nathan Jackson

### Condition:

- Totem pole is 9' tall with a 34" diameter base that is buried in the ground. The pole is in good condition.
- The top of thunderbirds head and curly projections have a well constructed copper cap applied.
- There are vertical natural drying cracks in the center of beak and on right side of face.
- A vertical natural drying crack, 1/8" at widest point runs from under the chin down to the feet. Another natural crack is located between whales head and the fin 1/8" at widest point.
- Very small, less than 1/16" opening, natural cracks run the length of the back of totem.
- A small amount of vegetative growth and mold are located inside of each wing next to the thunderbirds body and around the base of totem.



**Thunderbird and Whale**



**Copper cap**

**Thunderbird and Whale**



**Vegetative growth around base**



**Vegetative growth inside of wing**

**Recommendations:**

- Remove the vegetative growth on thunderbird with water and fiber brushes. Roundup or similar herbicide could be used to kill the vegetative growth around base of totem.
- Apply Bora-Care, a sodium borate based fungicide/insecticide to kill fungi and wood boring insects and to prevent re-infestation. Application can be made by spraying, brushing or both to all wood surfaces to a point of saturation, giving particular attention to end grain surfaces.
- Apply X-100 Natural Seal water repellent or similar paraffin oil based water repellent to retard water infiltration and slow leaching of the Bora-Care. Application with can be made by spraying or brushing. Re-apply both the Bora-Care and water repellent on a five year cycle.

**2. Eagle Grave Marker:** Carved in the late 1930s by John Wallace

**Condition:**

- Totem pole is 10' tall with a 42" diameter base that is buried in the ground. Fungal decay is the greatest threat to these carved poles that are being exhibited outdoors in the temperate, wet climate of Southeast Alaska. The fungi will consume the cellulose and lignin in the wood, eventually causing the wood to lose all structural strength. The decay is greater in these older CCC era carved poles. The body of this totem has a considerable amount of decay, with the right side having the most serious.
- The top of eagles head is stable and has previously had a cap applied.
- The beak has a split on right side  $\frac{1}{4}$ " wide X 9" long with a depth of 6".
- The tongue is split, with the grain, 5" back from the tip of tongue. Tongue is loose but held in place by two nails one on each side. There is a wedge shaped segment  $1\frac{5}{8}$ " wide x 1" deep missing from left side of tongue behind split.
- The right shoulder has a serious separation  $\frac{1}{4}$ " wide X 12" across. There are previous repairs to the wings.
- A 70" long split starts at mouth and continues down to the right knee. The right side has six repair butterfly patches that help hold the deteriorating side together. A butterfly patch was removed and a 9" penetration into the decayed wood with a spatula was gained. Butterfly patch was replaced. A considerable amount of decayed wood was removed from the decayed knot on this same side.
- A wedge shaped piece 2" at top X 48" long X 10" wide at bottom is separating from the back. Decayed wood is evident from the 8" penetration of the spatula.
- There are two vertical patches on the left side of back, a  $2\frac{3}{4}$ " wide X 48" long and a  $2\frac{1}{8}$ " wide X 24  $\frac{1}{4}$ " long.
- Vegetative growth is located around the base.



**Eagle Grave Marker**

Eagle Grave Marker



**Location of previous cap**



**Split in beak and tongue. Note nail head**



**Separation at right shoulder**



**Decayed knot**



**Decayed wood removed from behind knot**



**Butterfly patch removed**

### **Eagle Grave Marker**

### **Recommendations:**

- It appears there is no place to exhibit or store these totems in Ketchikan, and they are not to leave the area. The totem is to be exhibited out doors for as long as possible. The totem is settling some in the back but does not appear in danger of falling at this time.
- If that is the case than I would suggest have a native carver make drawings for a reproduction before more detail of the features are lost.
- Clean the totem with water and fiber brushes.
- A sheet lead or copper cap should be re-attached on top of head.
- The tongue can be adhered with an epoxy.
- Remove as much of the decayed wood as possible from behind the patches, in knot holes and splits, that can be removed with out causing further damage to totem pole. An air compressor fitted with a narrow nozzle works well to blow out debris from the cracks and splits.
- After the totem is cleaned apply Bora-Care in knot holes, cracks and splits, joints and where possible behind the patches. Application can be made by spraying or brushing to all wood surfaces to a point of saturation, paying particilar attention to end grain surfaces. A foamer would be of help to force the borates into the cavatives. We left one stored at Klawock Totem Park in 1997. It may still be there.
- Impel rods can be inserted into some of the openings.
- Apply X- 100 Natural Seal or similar paraffin oil based water repellent over the borates with a sprayer or brush. Re-apply both the Bora-Care and water repellent on a five year cycle.
- Roundup or similar herbicide can be used to remove the vegetative growth around base of totem.

### **3. Man Wearing Bear Hat:** Carved in 1995 by Israel Shortridge

#### **Condition:**

- Totem is 14ft. 6" tall with a 27" base buried in the ground. The pole is in good condition.
- A small amount of vegetative growth is located around the base of fin where it joins into mortise joint of hat.
- Several natural drying cracks run vertically down the pole.
- There is a small amount of vegetation around the base.



**Man Wearing Bear Hat**



**Vegetative growth around fin**

**Recommendations:**

- Clean totem with water and a fiber brush.
- Remove the vegetation around base of fin where it joins into hat.
- Roundup or similar herbicide can be used to kill the vegetation around base of totem.
- Apply Bora-Care to kill fungi and wood boring insects. Application can be made by spraying or brushing to a point of saturation, giving particular attention to end grain surfaces. Apply X-100 Natural Seal water repellent or similar paraffin oil based water repellent to retard water infiltration and slow leaching of the borates. Application can be made by spraying or brushing. Re-apply both on a five year cycle.

**4. Wandering Raven House Entrance Pole:** Carved in 1940 by Charles Brown

**Condition:**

- The totem pole is 50' tall with a 47½" diameter base buried in the ground. The entrance pole was first erected and the clan house constructed around it. Park Ranger, Mary Kowalczyk, has CCC era photos to document the construction of the clan house. **Note:** This is the only totem at Totem Bight that has the back carved out.
- A copper cap is covering a portion of the top of Ravens head. The copper cap was removed to observe the deteriorated condition under cap. The cap was not replaced for it was helping to channel moisture into an extensive split through the ravens head and body and downward between the feet to bentwood box the raven is standing on. The split appears to penetrate all the way from front to back of totem. Top of Ravens head and ears are deteriorated past repair. A 12" long spatula can be buried in deteriorated head.
- The beak is hanging loose, appears to be attached only by wooden dowels that are going through the mortise and tenon joint. The wide split, through ravens head and face, follows beside the beak and through the mortise joint leaving a very loose fitting joint. The beak could fall.
- The bent wood box is attached with eight spikes. It has a split through the center but only to depth of box.
- There are natural drying cracks along the back of the mink.
- The frogs left foot has some fungal decay on end grain and the back portion of leg is delaminating. A square hole is cut into the totem pole below the nose of the frog. Inserted into the hole is a square carved wooden removable plug.
- Below the frog is the standing figure of a man, Nasihline. The upper end grain portion of his head is starting to flake off.
- His ears were carved and then attached by two nails each. Left shoulder is delaminating and the end grain of shoulder has some deterioration.
- The deteriorated fin of killer whale was previously removed. Park Ranger, Mary Kowalczyk, has the fin in storage and will have a reproduction carved.
- The replaced nose in face above blowhole is loose.
- Raven-at-the-head-of-nass, (a chief), left ear has some fungal decay. The beak is very loose in mortise and tenon joint. Appears to be attached only by a wooden dowel rod. The lower part of the beak is separating and supported only by several inches of the front section of the beak. This lower part of the beak could break off and fall.
- The wings are in good condition. Top brace on left wing is split but wing is secure.
- Below the chief, is the raven's mother with a labret in her lower lip. A previous repair fill of nails and plaster has been used to fill a missing segment of the labret.
- A ¼" split on right side of pole entrance is stable.

### Wandering Raven House Entrance Pole





**Entrance Pole**



**Spatula buried 12" into deteriorated head of Raven**



**Ocean view through deteriorated ear of Raven**



**Split through face of Raven**



**Wooden removable plug below frog**



**Bent wood box attached with 8 spikes**

**Wandering Raven House Entrance Pole**



**Raven-at-head-of-nass separating beak**



**Raven`s mother labret repair**

**Recommendations:**

- The raven`s head at top of pole is too deteriorated to repair. The body also has some serious problems. I would suggest removing the beak before it falls. The head of the raven could be removed above the wings in order to check condition of wood for joining a reproduction head at the neck. It may be less complicated to cut the raven figure off where his feet join the bentwood box and carve a full figure reproduction to be joined above the bentwood box. Note: Apply a temporary waterproof cap that covers the deteriorated top of the head, until treatment can be determined. Install 2 to 3 impel rods in decay area and install cap as soon as possible.
- Epoxies can be used for consolidating the decay on the left back leg and foot of frog.
- Epoxies can also be used to consolidate the top of Nasihline`s head and left shoulder and to secure the loose nose in face above blowhole.
- Remove the beak from Raven-at-the-head-of-nass before it falls and have a reproduction carved. A reproduction fin will need to be carved for the killer whale.
- Remove the previous repair of nails and plaster in the labret located in lower lip of Raven`s mother. An epoxy could be used to restore the lost portion of the labret with a more pleasing appearance.
- Clean the totem and apply Bora-Care. Application can be made by spraying or brushing to all wood surfaces to a point of saturation, paying particular attention to end grain surfaces.
- Apply X-100 Natural Seal water repellent over the borates with a spray or brush. Re-apply both the Bora-Care and X-100 water repellent on a five year cycle.
- Note: It could be a problem having the wood dry enough on standing totems to use epoxies.

**5. Pole on the Point:** Carved late 1930s by Charles Brown

**Condition:**

- Totem pole is 68' tall with a 36" diameter base that is buried in the ground. **Note:** The base of pole is deteriorating and pole will have to be lowered.
- The lift maxed out at 60ft. and we could not view the top portion of shamans head but could see vegetative growth protruding out from left side of head. From condition of base the pole has to come down, so there was no reason to invest in a larger lift which also would be difficult to drive into the park.
- The nose is missing from the face of carved club the shaman is holding.
- There are numerous natural drying surface cracks over the face of the totem.
- The left wing of the eagle has a segment missing.
- The right breast, beside the beak of the cormorant is riddled with woodpecker holes.
- There is a ¼" wide crack through breast of cormorant down to head of raven.
- The raven has a replacement forehead and beak. A split and decay has occurred around large spike driven through center of beak. Numerous nails were used for attaching the forehead.
- A previous repair segment, 2" wide X 15" high is missing from left cheek of bottom figure, a bear, and a segment is missing from chin. A segment 3 ½" wide X 3 ½" high is also missing where it was split out of right hip. Two claws are missing from the right front paw and the left paw has two claws of a previous repair missing
- The body of the bear is deteriorating both from fungi decay and previous insect infestation. There are numerous repair patches in the body of the bear. Several patches were removed to expose the extensive decay of the wood and insect damage from carpenter ants.
- The base of the totem is also deteriorating where it enters the ground. A 10" blade of a spatula can be buried in the wood on several locations.



**Pole on the Point**

**Pole on the Point:**



**Shaman with vegetation protruding from head**



**Segment missing from left wing of eagle**



**Woodpecker holes in cormorant**



**Decay in beak of raven**

**Pole on the Point:**



**Missing segments from bears mouth and paws**



**Decayed wood and insect damage behind patches**



**Spatula buried at base of totem**

**Recommendations:**

- The totem will have to be lowered due to the deterioration of the base.
- Clean totem and remove the vegetation from head of shaman.
- To replace or not, the missing segments from the totem, such as the nose from face on shamans club and segment from wing of eagle is usually the Park Curators decision.
- Once the totem is lowered it can be thoroughly examined and extensive treatment can be determined.
- Having the totem lying horizontal is an advantage when applying Bora-Care. Application can be made onto all areas of the wood surface with little run off. Do not apply a water repellent at this time for some repairs will require the use of epoxies and the paraffin oil in the water repellent may interfere with the adhesion of the epoxies.
- Epoxies will be used for consolidation and adhesion.
- When lowered the totem will have to be protected from the elements.
- The totem will probably require a support post if re-erected.

**6. Blackfish Pole:** Carved in 1939

**Condition:**

- Totem pole is 39'3" tall with a 28" diameter base buried in the ground. **Note:** The totem is leaning at least two feet off plum to the right and approximately four feet off plum backwards. The totem is wicking water and has a considerable amount of wood decay. A strong North wind could possibly blow the totem down. Totem will have to be lowered.
- The tip of dorsal fin has serious deterioration and a heavy accumulation of vegetation is also growing in the hollow decayed tip. A split runs the full height of dorsal fin.
- There is considerable deterioration where the dorsal fin joins by mortise and tenon into head of raven. A twelve inch spatula can be buried into the head of raven on both sides of fin. An excessive amount of vegetation is growing on head of raven.
- The replacement beak of raven is loose.
- There are numerous cracks on surface of totem, left side showing more exposure to the weather. They flow down the front of each figure to the human figure at the base.
- There is a extensive split in the right shoulder of the.
- The front of pole has decay 1 ½" to 2" deep at the base just below ground level. **Note:** The base of totem is wicking water that is leaking out of a knot hole on right side, 44 inches above ground level. There is vegetation around base of totem.



**Blackfish Pole**



**Blackfish Pole**

**Blackfish Pole:**



**Vegetation and decay in tip of dorsal fin**



**Vegetation and decay in head of raven**



**Split in right shoulder of human figure**



**Water running out of knot hole**

**Blackfish Pole:**



**Blackfish Pole and Totem Bight SHP at 60' in the Air**

**Recommendations:**

- The totem will have to be lowered due to deterioration and it is leaning both backwards and to the right.
- Remove the vegetation from dorsal fin and head of raven. Have a native carver reproduce the dorsal fin.
- Secure the beak to face of raven with epoxies if head of raven is not too deteriorated. The head does appear to have serious deterioration and most likely the head of raven will have to be reproduced.
- Epoxies will be used to secure the split in right shoulder of human figure at bottom of pole.
- Once the totem is lowered it can be thoroughly examined and treatment can be determined.
- Totem will require cleaning and Bora-Care applied. Having the totem lying horizontal is an advantage when applying borates. Application can be made into all areas on the surface of the wood with little run off. Do not apply a water repellent at this time for some repairs will require the use of epoxies and the paraffin oil in the water repellent may interfere with the adhesion of the epoxies.
- When lowered the totem will have to be protected from the elements.
- The totem will probably require a support post if re-erected.

**7. Land Otter Pole:** Carved in 1996 by Nathan Jackson



**Condition:**

- Totem pole is 35' tall with a 38" diameter base that is buried in the ground. The totem pole was carved in 1996 and is in good condition.
- The top figure has a copper cap applied. Lichen growth is located on right cheek and right side of head.
- Lichen growth is also present on the left cheek of human figure directly below the top figure.
- There is lichen growth on the back of totem and is present on several locations along the right side down to and including base figure, the devil fish.
- Tree limbs are hanging over the totem with one limb rubbing against the back right edge.



**Land Otter Pole**



**Lichen along right side**

**Land Otter Pole:**



**Copper cap and lichen growth**



**Lichen growth on back of totem**



**Tree limb rubbing against totem**



**Lichen growth on devil fish**

**Recommendations:**

- The tree limbs were cut back the day after the totem was inspected by park personal. A radius of fifteen feet is ideal for air circulation which reduces vegetative growth.
- Clean totem removing the lichen. Roundup or similar herbicide could be used to kill vegetative around base of totem.
- Apply Bora-Care by spraying or brushing, giving particular attention to end grain surfaces.
- Apply X-100 Natural Seal water repellent by spraying or brushing over the Bora-Care. Re-apply both the Bora-Care and the water repellent on a five year cycle.

**8. Master Carver Pole:** Carved in 1941 by John Wallace

**Condition:**

- Totem pole is 51' tall with a 42" diameter base that is buried in the ground.
- There are two large ½" wide splits on the back side of eagle at top of pole. The blade of an 8" spatula can be buried in the decayed wood up to the handle. A vast amount of lichen and vegetation is growing from these splits. There are splits in the closed wings with narrower openings. There is also a vast amount of lichen and vegetation located on the face of eagle and on forehead of beaver the eagle is standing on.
- The fourth figure, the raven, has a crack through center and on each side of the beak.
- There is some decay at knot on corner of the bear's right eye.
- There are natural drying cracks on the surface of totem. Using a spatula, penetration up to a depth of 3 to 4 inches was gained. The wood appears solid in the cracks.
- The master carver has cracks full length of his body but is in good condition for his age.
- The feet of bottom figure, the eagle, have numerous cracks due to the end grain carving being exposed to the weather.



**Master Carver Pole**



**Lichen and vegetation growth**

**Master Carver Pole:**



**Eight inches of penetration into decayed wood**



**Lichen on forehead of beaver**



**Master Carver**



**Cracks in the feet of eagle**

### **Recommendations:**

- Clean totem removing the lichen and vegetation. Very carefully remove vegetation from cracks in head of eagle. Insert some impel rods into the splits in head of eagle and cover splits with a cap. Fungi decay will still occur but at a slower rate.
- Apply Bora-Care by spraying or brushing, giving particular attention to the end grain surfaces.
- Apply X-100 Natural Seal water repellent over the Bora-Care. Re-apply both the Bora-Care and water repellent on a five year cycle.
- Further deterioration will occur if the CCC era totems are left standing, usually the top figure being the more subject to decay. I would suggest testing the density of the base of each pole with a "resistograph" or similar instrument. If stable then it will be the parks decision as to how much deterioration they want to occur before lowering the pole for more extensive preservation treatment, or possibly carving a reproduction.

### **9. Sea Monster Pole:** Carved in the late 1930s by John Wallace

## Condition:

- Totem pole is 35' tall with a 32" base buried in the ground.
- A well made cap is installed on the top of the village watchman's hat.
- There is a 2" wide piece missing from back rim of hat. There are splits across the back of hat and head where more loss may occur. **Note:** Park Ranger, Mary Kowalczyk, stated in her 1993 condition survey that this missing piece was loose and that no plant growth was occurring. Mary also stated that the immature eagle's left side was cracked and could be moved if pressure was applied. Now fifteen years later the piece that was loose is missing from the hat, both wings of the immature eagle are split and there is now a considerable amount of yellow colored lichen on the hat and face of village watchman. The second figure an immature eagle also has a lichen growth on its face.
- Mary's reports are valuable documents that help track the condition during the intervening years. Also, most of the following condition assessments have occurred since her condition survey.
- An extensive  $\frac{3}{4}$ " wide split has formed along the entire back of village watchman between the neck and shoulders. The split continues down past his arms and through both wings of immature eagle. A split with this large opening will funnel rain and snow down into the inner structure of totem, creating a moist area for fungal decay. Water freezing during the winter will also help expand the crack.
- A woodpecker has drilled a large hole on lower end of left wing of immature eagle.
- There are numerous cracks on the surface of the totem.
- Located on left side of painted faces the second eagle is standing on, is a split that continues down the pole through the mythical sea monster.
- The small face under the sea monster's beak has some cracks in the end grain. The cracks are not as severe as other areas of carved end grain as the face is partly shielded by his beak.
- The base that the human figure is standing on is starting to flake off on the end grain, 13" above ground level. Back of pole has some deterioration but appears solid under 1" of decay.



Lichen on face of village watchman and eagle  
Sea Monster Pole:



Split along back of village watchman



**Sea Monster Pole**



**Split in left wing of immature eagle**



**Split along left side of painted faces**



**Hole made in left wing by a woodpecker**

**Sea Monster Pole:**

## Recommendations:

- Clean totem removing the lichen from upper figures. Insert impel rods into the spits along back of village watchman and into the splits in immature eagle`s wings. Apply a cap, even if it is only temporary, over the split on back of village watchman.
- Apply Bora-Care by spraying or brushing, paying particular attention to the end grain surfaces.
- Apply X-100 Natural Seal water repellent over the Bora-Care by spraying or brushing. Re-apply both the Bora-Care and water repellent on a five year cycle.

Further deterioration will occur to the CCC era totems that are left standing, usually the top figure being the more subject to decay. I would suggest testing the density of the base of each pole with a “resistograph” or similar instrument. If stable then it will be the parks decision as to how much deterioration they want to occur before lowering. Although the base of this pole arrears to be stable, it should be lowered in the near future to prevent loss of top figure, the village watchman. The extensive splitting of this figure and second figure, the immature eagle make looses likely if left untreated.

- Once the totem is lowered it can be thoroughly examined and a more extensive preservation treatment can be determined.

## 10. Raven at the Head of Nass: Carved in the late 1930s

**Condition:**

- Totem pole is 34' tall with a 33" diameter base buried in the ground.
- The top of hat on the chief at top of pole is split but the end grain is surprisingly fairly dense, some deterioration in the core of hat. **Note:** The hat on this totem is in a much more stable condition than the hat on the Sea Monster Pole.
- The hand is nailed to hat through finger. The forearm is nailed to elbow at ship lap joint. A piece 2" wide X 11½" long is loose on front of arm. Nails are driven through arm at shoulder.
- A ¼" wide crack is located on right side of face through eye and length of cheek.
- A woodpecker has made a hole in the breast of chief under left hand and on right side of pole above two knot holes.
- There is a ½" split that starts at feet of the chief and runs down front of pole to head of small human figure. A spatula can be inserted to a depth of 4½" and wood is solid at that depth.
- The third figure, Raven- at -Head-of-Nass, has the tip of his beak missing and the mortise and tennon joint of beak is loose. It is now attached by nails.
- A replace patch 3½" wide X 20" long is located in left cheek of raven. Graffiti is located on both wings.
- Decay is occurring in a hole on inside of right leg. The carved end grain of knees is surprisingly solid, very little penetration with an ice pick.
- Three patches are located on the left back side of pole. Two of the patches, one stacked on the other, measure a length of 67½" X 3½" wide. The third patch is 24" long X 3½" wide. There is fungal decay behind all three patches.
- Log defect crevasse are located on back of totem at the base. They were formed when the bark fell out of a crease in the log. Some debris was removed from several of these openings.



**Raven-at-Head-of-Nass**

Raven-at-Head-of-Nass



**Split in hat**





Note stable condition of hat



Woodpecker made hole in breast



Replacement patches on back of pole  
Raven-at-Head-of-Nass



Hole on inside of right leg and graffiti on wing



**Crevasse at base of totem**



**Tip missing from Raven's beak**

## **Recommendations**

- Clean the totem removing the debris from cracks and crevasses.
- Insert several impel rods in the split in hat of top figure. Apply a sheet lead cap bending it down over the outer edge.
- Apply Bora-Care by spraying or brushing, giving particular attention to the end grain surfaces.
- Apply X 100 Natural Seal water repellent by spraying or brushing. Re-apply both Bora-Care and the water repellent on a five year cycle.
- The loose piece on arm can be adhered with epoxies.
- Have a tip for the beak carved and adhere with epoxies, if the park so desires.
- Insert an impel rod into the hole on inside of right leg and several around base of totem.
- Remove the patches on back of pole and the decayed wood behind the patches. If the pole is stable the patches can be adhered back with epoxies after drying out or not put back.
- Further deterioration will occur to the CCC era totems, usually the top figure and at base of pole below ground level, being the more subject to decay. I would suggest testing the density of the base of each pole with a "resistograph" or similar instrument. If stable then it will be the parks decision as to how much deterioration of totem figures they want to occur before lowering for more extensive preservation treatment.

**11. Kat's Bear Wife:** Carved in the late 1930s (top figure, a bear, was carved in 1985 by Israel Shotridge)

## Condition

- Totem pole is 35' tall with a 24" diameter base that is buried in the ground.
- Top figure a bear is in a deteriorated condition. There are numerous splits running length of bear's back. The head also has numerous splits. The 8" blade of a spatula can be buried up to the handle. A heavy growth of yellow colored lichen is sprouting out of the splits in the back and on head of bear. The right deteriorated ear has fallen out. Mary has the ear in storage.
- Mary stated in her 1993 condition report that there was moss growing on the bear and decay had begun, but bear was in relatively good shape. Fifteen years later there is extensive decay to the bear figure. **Note:** A low quality red cedar log must have been selected for carving the bear figure to have deteriorated this fast in only twenty three years. This style of top figure with all the exposed upper surface is the most susceptible to decay.
- On the front of pole a previous repair patch is located at the fourth paw down from bear. As Mary described in her report the patch does sound hollow underneath when tapped on. There probably is decay under the patch.
- The base of pole appears stable.



Kat's Bear Wife



Missing ear and lichen growth

Kat's Bear Wife



**Performing brain surgery**



**Deterioration in back of bear**

### **Recommendations**

- Clean the totem, removing all the lichen growth from the cracks and surface of the bear.
- Apply Bora-Care by spraying or brushing, paying particular attention to the end grain surfaces and on back of bear, working it down into the cracks and crevices with a brush. Clean the decayed wood out of mortise in right ear and insert an Impel-Rod in mortise. Select a native carver to carve a reproduction ear and adhere with epoxies. A cap attached over the back of bear would extend the life of figure, which is limited.
- Apply X 100 Natural Seal by spraying or brushing. Re-apply both the Bora-Care and water repellent on a five year cycle.
- Remove the patch at the paw print and check to see if there is decay behind it. Remove decay if present. After drying the patch can be adhered with epoxies. Before replacing patch insert Impel Rods.
- To determine if the base is stable, I would suggest testing the density of the base of pole with a "resistograph "or a similar instrument.
- In time, lower the Bear and have a native carver carve another reproduction. The bear is attached by a mortise and tenon joint and can be lifted off with a crane. Have the carver apply a coat of sodium borates before he paints the totem. Tim-Bor, sodium borates, can be used on the newly carved green log and it is much less expensive than Bora-Care.

### **12. Kadjuk Bird Pole:** Carved in the late 1930s

## Condition

- Totem pole is 57' tall with a 37" base buried in the ground.
- The wings of Kadjuk bird are replacements. Batten boards are attached across the back of replacement wings. They extend over segments of CCC era wings and are secured to the back of Kadjuk bird with both nails and lag bolts. There is serious deterioration to the segments of CCC era wings and back of Kadjuk bird. Decayed wood is evident in the back of Kadjuk bird, under batten boards and between the batten boards. There are splits and separation of wood. Vegetative and lichen growth covers the back. A top figure with this large amount of semi-flat surface exposed to the weather is very susceptible to fungal decay.
- The head also has serious problems, splits run with and across the grain. There is decayed wood with lichen growth. There are repair patches in the face. **Note:** I could not perform further examination to the back, upper most part of Kadjuk bird. The lift was maxed out at 60ft. The breast of the Kadjuk bird appears to be stable where it joins pole with a mortise and tenon joint.
- The second figure, the raven, has a split forming in the right ear that could break off. The left ear is split across full width of ear. Numerous nails are driven into the ears. Both ears set up on the head and are joined to the head by a mortise and tenon joint. This leaves a pocket for the moisture to seep down into mortise and start fungal decay that is evident in the joint. There are ¼" wide cracks on the forehead and face. A spatula can be inserted to a depth of 6". The wood is solid at that depth. There are other surface cracks on the pole with less depth. The beak is attached with a mortise and tenon joint that is loose. It is being held in place by a nail on top of beak and a nail on each side. The tip of beak is missing.
- Both wings have been repaired. There is a small segment missing from lower tip of each wing.
- Both thumbs of the frog woman are missing and a ¼" crack appears in both of her wrist.



Kadjuk Bird



Patch repair and splits in head of Kadjuk Bird

Kadjuk Bird



**Vegetative and lichen growth on back and head**



**Fungi decay and splits in back of Kadjuk Bird**



**Split and decay in left ear of raven**



**Cracks in forehead and face of raven**



**Kadjuk Bird**

**Kadjuk Bird**

## Recommendations

- The replacement wings extend over the segments of the original wings and part of the back. The segments of CCC era wings and the portion back under the replacement wings are deteriorating as is the open part of the back. The Kadjuk bird should be lowered for preservation treatment in the near future. If too deteriorated, a replacement may have to be carved. Should the Kadjuk bird remain on the totem, then insert Impel Rods along the back and install a cap over the back and segments of original wings. It will have to be formed over and down and in between the batten boards, no easy feat. The decayed wood in the back and segments of original wings absorbs moisture like a sponge. The cap will repel moisture and also act as a deterrent to vegetative and lichen growth. The cap will also slow the process of fungal decay.
- At present clean the totem, removing the vegetation and lichen growth.
- Apply Bora-Care by spraying or brushing, giving particular attention to the end grain surfaces and the back of the Kadjuk bird.
- Apply X-100 Natural Seal water repellent by spraying or brushing. Re-apply both the Bora-Care and the water repellent on a five year cycle.
- The split ears and the loose beak on the raven can be adhered with epoxies.
- Have a replacement tip carved for the beak, which can also be adhered with epoxies.
- Further deterioration will occur to the CCC era totems, usually the top figure and at base of pole below ground level, being the more subject to decay. I would suggest testing the density of the base of each pole with a “resistograph” or similar instrument. If stable than it will be the parks decision as to how much deterioration of the totem figures they want to occur before lowering.

## 13. Halibut Pole: Carved in 1970 by Nathan Jackson

**Condition:**

- The totem is 16' with a diameter base of 14½" buried in the ground.
- Lichen and moss growth has formed in the numerous cracks in the top of totem, proper left side of halibut. The cracks extend from nose to tip of tail with lichen growing in the cracks from the mouth to tip of tail. Lichen growing from the cracks reveals fungal decay has started.
- The base of pole is very unstable, can be moved when light pressure is applied. Several inches of dirt was removed at back of totem base to find extensive deterioration in the core of the pole. A spatula can be inserted 10½" from back to front, which leaves only a 4" thick wall left of the pole supporting a 6' long X 3' wide halibut figure.
- The right side of halibut, side with eyes, is mounted to the pole with a mortise and tenon joint. This side of the halibut is in good condition.
- Note: In Mary's condition report in 1993, mold was the only fungal growth and located only on mouth and tail.



**Halibut Pole**



**Lichen growth in cracks in left side of halibut**



## Halibut pole



Mortise and tenon joint



Extensive deterioration at base of pole

## Recommendations

- Lower the pole. I would suggest having Nathen Jackson retire the pole section and carve a replacement. The carving is straight line carving and would probably be less expensive than carving out the back of the deteriorated pole and then fitting and mounting totem onto a support post.
- Clean the totem removing the lichen from the cracks very carefully.
- Apply Bora-Care by spraying or brushing making sure the borates go down into the cracks on left side of halibut. Borates will not penetrate the painted surface of right side, but will seep into the surface cracks of halibut.
- Apply X-100 Natural Seal water repellent over the Bora-Care by spraying or brushing. Re-apply both the Bora-Care and water repellent on a five year cycle.
- **Note:** This style of top figure, with such an amount of exposed horizontal upper surface exposed to the weather is highly susceptible to fungal decay. A cap installed over the top of the halibut would greatly increase the longevity of the halibut figure. I realize it would be a large cap, but cap could be constructed of lead or copper and formed to fit the semi-flat top and would not be noticeable after the cap ages. Also it would act as a deterrent to fungal decay, vegetative and lichen growth.

## 14. Thunderer`s Pole: Carved in the late 1930s

**Condition:**

- The totem is 20'6" tall with a 30" base buried in the ground.
- A small copper cap is installed on the cap of top figure, Thunderer.
- The numerous radial cracks around cap on Thunderer's head appear stable. Previous repairs are located on back of his head and a small area of fungal decay is progressing.
- There are numerous surface cracks, several running full length of totem. The crack with widest opening starts in face of Thunderer, continues down through his chest, (9/16" wide opening), between legs, through body of human figure and between legs to ground.
- Extensive cracks have formed on the end grain surface of the knees.
- Segments of wood are missing from both arms and legs of human figure. Old graffiti is located on left leg. Vegetative growth is located around base of totem.
- The totem is leaning at least a foot off plum to the left and backwards. There is extensive fungal decay in the interior of pole at the base. A segment, half the width of pole has been cut out of the back at grade level. The blade of a spatula penetrated eight inches at this location.



**Thunderer's Pole**

## Thunderer`s Pole



Small copper cap



Segment cut from base and vegetative growth



Cracks in chest of Thunderer



Graffiti and vegetative growth

## Recommendations

- Totem is leaning and base has extensive fungal decay. **Lower totem in the near future.**
- Clean the totem and remove the vegetative growth at base. Round up can be used to kill vegetation around the base.
- APPLY Boar-Care by spraying or brushing, giving particular attention to end grain surfaces.
- Apply X-100 Natural Seal water repellent over the borates by spraying or brushing. Re-apply on a five year cycle.
- Remove copper cap and install a lead cap forming it over the rounded edge of Thunderer`s cap.
- Once the totem is lowered the back of totem will have to be carved out removing the fungal decay. A pressure treated or red cedar support post can be fitted and mounted to back of totem. Attach a metal support at least five inches above ground line on support post for totem to rest on. The totem can be bolted to support post with stainless all-thread rods, countersunk and plugged with red cedar. Note: Use this treatment for majority of totems to be re-erected.
- A more extensive preservation treatment can be determined after totem is lowered.

## 15. Village Watchman (left side facing clan house): 1940

**Condition:**

- Corner post is 22'8" tall with a 30" diameter base that is buried in the ground. It is a corner post that is structured into the clan house.
- The top of watchman's hat has a lead cap that is separating around the edge. Located under the cap is a layer of felt paper. The end grain wood under cap is in good condition.
- Located on back edge of hat is a repair patch 12" wide X 6½" high. The repair is loose and ready to fall out.
- The hat rim has numerous surface cracks, largest opening ¼" in front of hat.
- Numerous surface cracks run through each shoulder. A ¼" wide crack starts on the right side of face, through arm and down past roof to ground. Deepest penetration with spatula is 5" and the wood appears solid at that depth. The top of legs have numerous surface cracks.
- A replacement right leg and foot is loose.
- Graffiti is cut into the left side of watchman.
- A copper shield circles the totem at roof line. Base of pole is stable.



**Village Watchman**



**Revealing layer of felt paper**



**Revealing loose right leg**



**Repair patch that is loose**

**Village Watchman (left side)**



**Surface cracks in hat and body**



**Graffiti on left side**

**Recommendations:**

- Remove the separating lead cap and replace with one that will bend down over outer edge of hat.
- Adhere with epoxies the loose repair patch in back of hat and the loose replacement leg.
- Clean the totem and apply Bora-Care. Application can be made by spraying or brushing to all wood surfaces to a point of saturation, paying particular attention to end grain surfaces.
- Apply X-100 Natural Seal water repellent over the borates with a spray or brush. Re-apply both the Bora-Care and the X-100 on a five year cycle.

**16. Village Watchman** (right side facing clan house): 1940

**Condition:**

- Corner post is 22'8" tall with a 30" diameter base buried in the ground. It is a corner post and structured into the clan house.
- The end grain on top of hat is split four ways to the center. Remnants of a lead cap remain around outer edge.
- One of the more noticeable splits is 3/8" wide. It starts in the front rim of hat, continues down through right eye, right wrist, around right knee and foot to ground.
- There is graffiti carved into the right shoulder, hip and leg of the watchman.
- The left shoulder has a 1/4" crack.
- A piece 5" wide is starting to flake off on backside of watchman. There is less flaking occurring at base of watchman figure.
- A copper shield completely circles the totem at roof line.
- Located directly under the roof line is a repair patch, (10 1/2" wide X 24 1/2" high).
- Base of pole is atable.



**Split end grain of hat with remnants of lead cap**



**Split in rim of cap down through face**

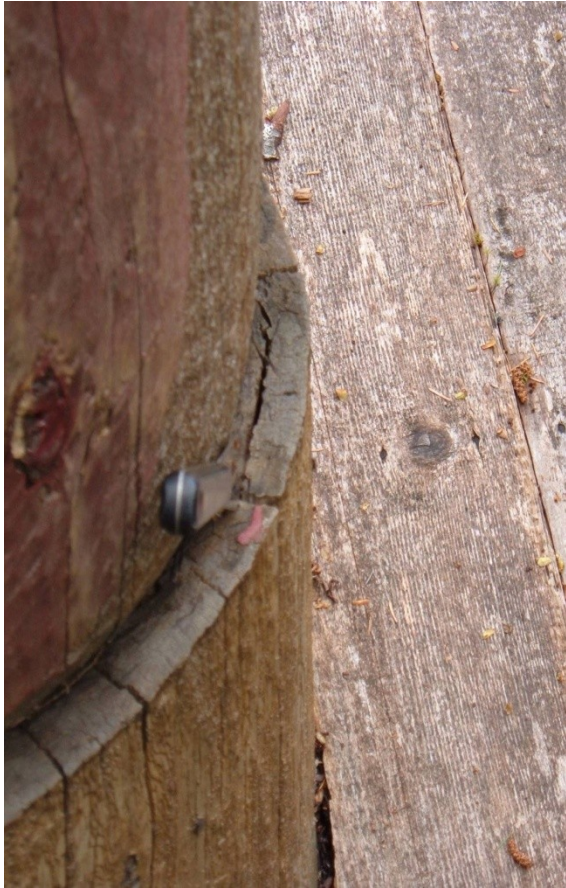


**Deterioration in left foot**

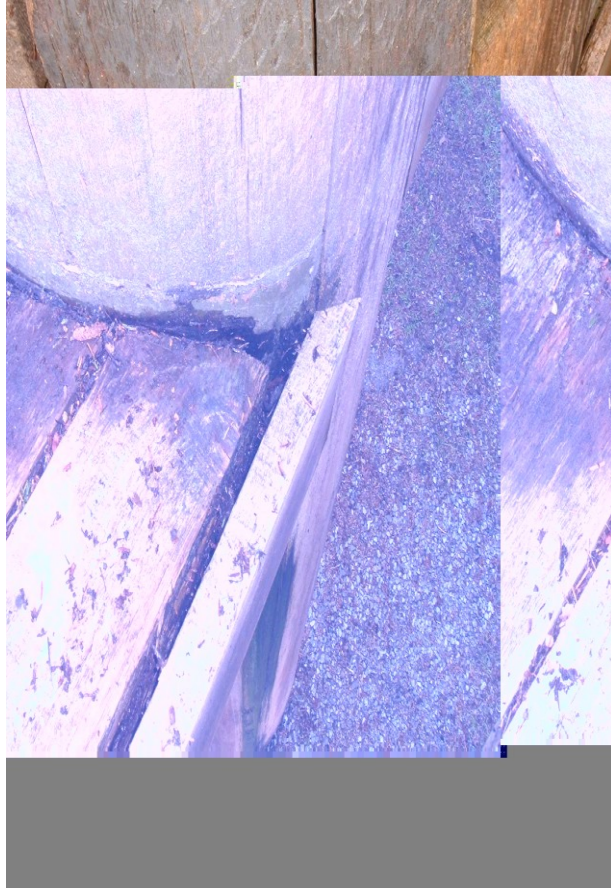


**Graffiti on right side**

**Village Watchman** (right side)



**Wood flaking at base of watchman**



**Copper shield around totem at roof line**

#### **Recommendations:**

- Clean the totem and apply Boar-Care. Application can be made by spraying or brushing to all wood surfaces to a point of saturation, paying particular attention to end grain surfaces, such as the end grain top of village watchman hat.
- Impel rods can be placed in the splits in hat and a cap applied leaving it bend down over outer edge of hat. Sheet lead works well in forming a cap.
- The left foot will require epoxy consolidation.
- Apply X-100 Natural Seal water repellent over the borates with a spray or brush. Re-apply both the Bora-Care and the X-100 on a five year cycle.

#### **Contact Information**

## **Conservator**

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## **Sources of supplies**

Bora-Care; Impel Rods; Epoxy and Water Repellent  
TWP, P.O. Box 2160, Kirkland, WI 98083, Tel. 1-800-827-3480

X-100 Natural Seal Water Repellent  
ABR, 9720 South 60<sup>th</sup> Street, Franklin WI 53212, Tel. 1-800-346- 7532