Historical Resources

148. An archaeological inventory survey conducted of the Petition Area by Haun & Associates in April 2000 identified forty (40) sites with 56 component features remaining within the Petition Area. These sites included 35 single feature sites and ten complexes of features. The feature types surveyed included the following: modified outcrops (22); terraces (12); caves (10); mounds (9); pahoehoe excavations (7); cairns (6); walls (5); trails (3); enclosures (3); concentrations of marine shell (2); a cupboard; and a series of abraded surfaces. Feature function included the following: agriculture (6); temporary habitation (14); resource procurement (7); marker (6); livestock control (3); transportation (3); tool manufacture (1); and storage (1).

149. Five additional lava tube caves were also identified within the Petition Area during the April 2000 survey. Upon examination, these caves were determined to contain no cultural remains.

150. The site and component features conform to traditional Hawaiian site/feature types based on previous archaeological work and historic documentary research. Temporary habitation sites and trails were identified. The trails appear to be "branch" trails. These trails were distinguished from major *mauka-makai* and coastal transportation routes because the branch trails facilitated access to resource and subsistence areas in the immediate vicinity of habitation sites. The temporary

habitation sites contained very limited amounts of cultural material. Cultural deposits were uncommon, and where present, very shallow. These characteristics, and the limited evidence for structural modifications to the caves, indicated that the temporary habitation use was of very limited duration. Historic remains consisted of ranch walls.

151. Sites identified and relocated during the survey were assessed for significance based on the criteria outlined in the HAR Chapter 275, Department of Land and Natural Resources-State Historic Preservation Division Rules Governing Procedures for Historic Preservation Review. In the survey report, all of the sites were assessed as solely significant under Criterion "d." These sites have yielded information important for understanding late prehistoric to historic land use in the project area. The mapping, written descriptions, photography, and test excavation at 32 of the 40 sites adequately documented them and no further work or preservation was recommended.

152. Eight sites (21999, 22010, 22014, 22016, 22017, 22018, 22023, and 22032) retained the potential to yield information important for understanding prehistoric and historic land use. These sites consisted of caves containing portable remains, and shallow cultural deposits, or surface scatters of food remains. Data recovery at the sites would entail surface collection and excavation where deposits are present. The data

recovery work would be guided by a Data Recovery Plan prepared for the Department of Land and Natural Resources – State Historic Preservation ("DLNR-HPD") review and approval.

153. The DLNR-HPD accepted the archaeological inventory survey report on October 16, 2000. The agency's review found the survey coverage, background research, and site descriptions to be adequate, and concurred with the significance assessments and recommended treatments.

National Park Service Mandates

154. KAHO is a natural and cultural resource of the utmost value both to the State of Hawaii and the nation as a whole, representing some of the State's most important natural systems, habitats, and valued cultural, historical, and natural resources.

155. Congress authorized KAHO on November 10, 1978, to provide a center for the preservation, interpretation and perpetuation of traditional native Hawaiian activities and culture and to demonstrate historic land use patterns as well as provide needed resources for the education, enjoyment and appreciation of those activities and culture by local residents and visitors, and be administered in accordance with provisions of the law generally applicable to the National Park System.

156. A substantial public investment – over 70 million dollars of public funds – was spent on the purchase of the land within the National Park. This Commission recognizes the economic value of this coastal National Park, providing such exquisite natural, recreational and cultural resources.

157. The National Park Service's mandate and the purpose of KAHO is to restore and resurrect many of the park's cultural and natural resources.

158. The National Park Service is also required to encourage compatible adjacent land uses and to pursue mitigation of potential adverse effects on park resources and values by participating in the planning and regulatory processes of other entities, such as this Commission.

159. Should impacts to the natural or cultural resources of the National Park occur, the National Park Service is directed to take all necessary actions to safeguard national park resources. Those who destroy or injure park resources are liable to the United States for response costs and damages.

National Park Management

160. When a development is proposed up-gradient of a National Park and the contaminants threats are potentially serious, the National Park recommends an Ecological Risk Assessment be conducted consistent with their criteria. No party conducted such an assessment.

161. The Environmental Protection Agency's 1998 guidance states that special measures should be taken to protect nationally important resources.

162. The philosophy of "The Precautionary Principle" was developed to address the inherent complexities of natural systems and the difficulties of predicting the effects of human activities on dynamic ecosystems.

163. The Precautionary Principle states, in effect, that in the absence of scientific agreement or exhaustive scientific evidence, precautionary measures should be taken to protect important natural and cultural resources.

164. The Precautionary Principle is gaining wider acceptance in the United States and worldwide during the past decade as the basic rule that should govern activities that affect the ocean environment and the Commission accepted this principle as applicable to this Petition.

165. The Commission supported this philosophy as applied to National Parks and determined that, for all proposed development adjacent to or near a National Park that raises threats of harm to the environment, cultural resources, or human health, precautionary measures should be taken to protect the National Park cultural and natural resources, even if some cause and effect relationships are not fully established scientifically.

166. The Park Service applies the Precautionary Principle to its management decisions. In the absence of scientific agreement or exhaustive scientific evidence, the Park Service will err on the side of the protected resource.

167. The water in the National Park, whether water in the fishponds, the anchialine ponds or the ocean water is a critical park resource in and of itself.

168. One of the critical elements in maintaining the National Park's cultural and natural environment is maintaining a high level of water quality because some of the Park's most important cultural and natural resources are the unique anchialine ponds and fishponds that were utilized by Hawaiian families for hundreds of years and are home to threatened and endangered species.

169. Evidence shows that the proposed development will increase nutrients and release contaminants into the groundwater that flows into the National Park, and that the existing industrial development already has.

170. As to the extent of the potential harm from the demonstrated and potential impacts, the proposed industrial development may adversely impact the National Park.

171. For this Petition, there was a lack of scientific study and research as to the potential adverse impacts from the proposed development. No risk assessments as prescribed by NPS have been done to determine that no harm will come to the

resources of the National Park, including the anchialine ponds, the coral reef, and the endangered and threatened species that rely on the health of those systems for habitat, and are considered sacred to native Hawaiians. Contrary to Petitioner's position, a lack of scientific inquiry is cause for caution.

Cultural and Historical Resources

172. Kaloko-Honokohau has a long, rich cultural history that was and is very important to the Hawaiian culture.

173. During the 1600 and 1700's at Kaloko, most Hawaiian families, around 200 to 300 people, lived on the shore. These Hawaiians survived in Kona's dry arid climate because the unique anchialine pools provided drinking water. The Kaloko Fishpond, Aimakapa Fishpond, and Aiopio Fishtrap also provided fish and bait for Hawaiian families.

174. Kaloko fishpond is one of the most significant cultural features in the National Park. The fishpond could produce up to 5,000 pounds of fish per year. A cave in the vicinity of Kaloko fishpond is the reputed burial location of Maui ruler Kahekili and King Kamehameha I.

175. Royal residences were set up along the shoreline, where today we find heiau, house platforms and enclosures, burial sites, petroglyphs, agricultural sites, and historic trails.

176. Interviews and oral histories of the Kaloko-Honokohau area highlighted the importance of the mauka-makai relationship and the management of the ahupuaa in Hawaiian culture.

177. Fishermen continue to use the traditional opelu ko`a as passed down for generations.

178. Interviewees expressed concern about surface runoff and wastewater disposal affecting the water quality in the anchialine pools and Kaloko and Aimakapa fishponds.

179. Water is sacred to native Hawaiians – the dynamic thread that ties the environment together.

180. Knowledge of the water cycle and its underground flow was integrated into native Hawaiian daily cultural practices and passed on to their descendents.

181. What affected the water cycle affected the total environment.

182. In recognition of the significance of these cultural resources, Congress created the Honokohau National Landmark District in 1972 before establishment of the National Park. National Landmark status is the highest level of protection given to an area for its nationally important cultural resources.

183. Important sacred native Hawaiian resources involving waters of the National Park include Kahinahinaula (Queens Bath) and anchialine pools, the

Aimakapa and Kaloko fishponds, Aiopio fishtrap and adjacent heiau, and near-shore waters used for pikai ceremonies.

184. The National Park waters are a central element in many Native Hawaiian practices and rituals performed within the National Park boundaries. These traditional practices rely heavily on the quality of the water, including groundwater, in the National Park.

185. Native Hawaiians utilize traditional techniques such as pole, spear, and net fishing for subsistence gathering and ritual needs. Hawaiians also gather other marine food resources from the National Park, such as limu, wana, opihi, and octopus.

186. The opae`ula in the anchialine ponds provide traditional bait and chum for offshore fishing.

187. Religious ceremonies are still carried out by local Hawaiian families within the National Park.

188. In furtherance of its mandate, the National Park Service plans to restore many of these cultural resources, including restoring Kaloko fishpond to recreate it as a functioning fishpond for traditional Hawaiian fishing practices.

189. The makai wall and the makaha at Kaloko fishpond are being repaired/built and ultimately will become a productive, functioning fishpond.

190. Any impacts to waters in the National Park would, in and of itself, be an impact to cultural resources.

191. Degradation of water quality from mauka industrial development poses a threat to the traditional native Hawaiian practices in the National Park.

192. Increased nutrients in the groundwater flowing into the anchialine ponds could reduce or eliminate fish and bait species used by native Hawaiians for traditional fishing practices.

193. Toxic contaminants, which can lead to fish kills or bird die-offs, impact the use of Hawaiian fishponds and the ability to catch and consume fish in the National Park.

194. Impacts to near-shore waters might alter or reduce marine species utilized by native Hawaiians. A reduction in marine species due to development is a direct impact on native Hawaiian gathering rights.

Threatened and Endangered Species

195. The National Park is home to several endangered and threatened species as well as a "species of concern" awaiting listing under the Endangered Species Act ("ESA").

196. The National Park is home to the endangered Hawaiian coot (*Fulica alai*) or `alae ke`oke`o, the endangered Hawaiian stilt (*Himantopus mexicanus knudseni*) or

ae`o, the critically endangered hawksbill sea turtle (*Eretmochelys embricata*) or honu `ea, the threatened green sea turtle (*Chelonia mydas*) or honu, and one candidate species, the Orangeblack damselfly (*Megalagrion xanthomelas*).

197. Other transient endangered species that are found within the National Park boundaries are the Hawaiian monk seal (Monachus schauinslandi) or 'ilio-holo-i-ka-uaua, and the humpback whale (Megaptera novaeangliae), or kohola.

198. Anchialine pools in the park contain rare and endemic organisms that may eventually be listed. In addition, new species and new records of known species have been discovered in the National Park in the past decade and it is expected that more will be discovered.

199. Marine mammals and migratory birds, which are commonly found in the National Park, are also protected under other Federal laws, including the Marine Mammal Protection Act and the Migratory Bird Treaty Act.

200. Migratory shorebirds, including the indigenous Pacific Golden Plover, and transient marine mammals, including seals, whales and dolphins, use the near shore and offshore habitat of the National Park.

201. The Endangered Species Act, the Migratory Bird Treaty Act, and the Marine Mammal Protection Act prohibit the general public, including developers, from

"taking" (which includes harming or killing) endangered species, migratory birds, or marine mammals.

202. The National Park cannot fulfill its responsibility to ensure clean habitat for these protected species without the cooperation of neighboring landowners.

Waterbirds

203. The Hawaiian coot is endemic to the Hawaiian Islands (occurs only in Hawaii). The Big Island population is around 200 birds on the Kona Coast and 75 birds on the Hilo Coast.

204. The Hawaiian stilt is also endemic to the Hawaiian Islands. The Kona Coast supports the largest number of stilts on the Big Island.

205. Aimakapa Pond is a significant breeding, nesting, and feeding area for the endangered Hawaiian stilt and Hawaiian coot and is also very important as an overwintering and stopover area by migratory waterbirds, and shorebirds.

206. Loss of wetland habitat is the primary cause of the decline of endangered Hawaiian waterbirds. Urbanization of areas around wetlands causes damage to water quality from urban runoff and other inputs such as nutrients and pathogens.

207. Altering the hydrology of wetland areas makes them less suitable, or even unsuitable, for native waterbirds. Alterations include withdrawals from municipal water sources, which can change the depths of wetlands, affect temperature changes,

and cause saltwater intrusion into coastal groundwater supplies, which then alters salinity levels in associated wetlands.

208. Waterbirds can be severely impacted by avian disease. The most prevalent avian disease affecting Hawaii's waterbirds is botulism, which has been recorded on Kauai, Oahu, Maui, and Hawaii, including Aimakapa fishpond.

209. In 1994, the waterbird populations in Aimakapa fishpond experienced an outbreak of avian botulism.

210. The only known outbreak of botulism Aimakapa fishpond occurred after the development of the first phases of Petitioner's industrial development.

211. While the exact causes of avian botulism are not known, experts on the subject have associated some outbreaks with increased nutrients from sewage or wastewater.

212. Increased nutrients can cause algal blooms that deprive water bodies of oxygen. A lack of dissolved oxygen can kill vertebrate and invertebrate species, giving the bacteria that produces botulism toxin the opportunity to grow.

213. Industrial contaminants (such as pesticides or other toxics) that reach a water body can also cause acute die-offs, and set the stage for avian botulism.

214. One of the recommended means of preventing further botulism outbreaks is to maintain water quality and avoid polluted runoff from reaching waterbird habitat.

215. In addition to botulism, environmental contaminants in coastal wetlands are a serious concern for waterbirds.

216. Toxins can kill birds directly or reduce their ability to reproduce.

217. Birds are susceptible to toxins accumulated within the food chain.

218. Petroleum products cause adverse impacts to any bird that comes into contact with it. For endangered bird species, this impact would constitute a risk of a violation of the Endangered Species Act.

Damselflies

219. The orangeblack damselfly (Megalagrion xanthomelas) was first discovered in the National Park on the backside of Kaloko Pond nine years ago.

220. The orangeblack damselfly is probably the most threatened of the Hawaiian damselfly species.

221. The population of orangeblack damselflies in the National Park is especially important and valuable because other recently discovered populations of the species on the Big Island are in areas slated for development.

222. Damselflies as a group is sensitive to water quality. Their presence is an indicator that the water quality is good.

Impacts to Damselflies

223. Threats to the orangeblack damselfly include loss of coastal aquatic

habitat, including anchialine pools. Modification of habitat, such as removal of complex plant communities, native sedges, or stream channelization, has a devastating impact on abundance.

224. Unlike artificial habitats, such as golf courses, only native settings – which include a complex community made up of native sedges and other aquatic algae plant species -- allow the orangeblack damselflies to co-exist with alien fish, a significant problem with anchialine pools in Hawaii.

Marine Turtles

225. National Park waters provide important, perhaps critical, foraging and resting habitat for the juvenile class of green sea turtles.

226. As many as 250 juvenile green turtles are supported in the National Park's habitat. The turtles congregate to feed on the algae growing on the tideflats, in `Ai`opio, and in the sandy area off Aimakapa pond. The sandy beach in front of Aimakapa is a common haul-out for basking turtles. Turtles are also commonly seen swimming in front of Kaloko Pond. SCUBA divers observe turtles at offshore "cleaning stations" on a regular basis.

227. A 30-inch hawksbill turtle has been regularly sighted in National Park waters since November 2000. Smaller hawksbill turtles were occasionally seen at the

turtle "cleaning stations" offshore. Anecdotal reports suggested these turtles once nested in the National Park.

228. The health of the sea turtle population, as with other animals, is likely directly tied to the quality of their habitat. The National Park currently supports a healthy population of juvenile green sea turtles and healthy appearing hawksbill sea turtles.

Impacts To Marine Turtles

229. An increasing threat to the recovery of marine turtles worldwide is the infectious fibropapallomitosis disease. This disease primarily affects the green sea turtles, but also affects hawksbill turtles.

230. To date, juvenile green turtles on the Kona Coast are virtually free of the disease. However, juvenile turtles of the size found in the park are the size most frequently stricken by the disease, so the National Park's turtle population is particularly vulnerable.

231. Although Kona Coast turtles are healthy now, it is very important to look ahead and keep them healthy. If most of the currently infected turtles in Hawaii die before reaching sexual maturity (about 40 years), then it is possible that the National Park's sea turtle population and others on the Kona Coast would be the main populations left to repopulate the entire Hawaiian green sea turtle stock.

232. Discussions in the published literature have suggested connections between turtle populations affected with the disease and nearby urban areas.

Coastal Waters

233. KAHO consists of 596 acres of marine environment. These park waters support important cultural and natural resources.

234. The offshore waters at the National Park are recognized for their high quality and critical importance to the coastal ecosystem.

235. The Hawaii State Department of Health ("DOH") classified National Park waters as double A (AA). The DOH's objective of this classification is to preserve the natural pristine state of the water with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions.

236. The State Department of Land and Natural Resources has designated the National Park waters as a Fish Replenishment Area/ Fisheries Management Area. This is recognition of the important marine resources in the park. The park waters are an important, accessible fishing and gathering grounds for the local community.

237. The National Coral Reef Initiative is a Federal reef protection and research program that includes this National Park's important reef system in recognition of its national significance.

238. The marine and shoreline areas of the National Park support many

Federal and State listed endangered and threatened species, marine mammals and migratory and resident shorebirds.

239. Use of park marine resources by people, including the local community and visitors is an important aspect of this National Park, especially for the practice of traditional and customary native Hawaiian rights. Uses of the shoreline include recreational and subsistence fishing (including invertebrates and limu), swimming, snorkeling, sunbathing, and wildlife viewing (birds, turtles, and marine organisms in the tidepools and reefs).

240. The offshore area includes sixteen day-use moorings within park waters are used on a daily basis by SCUBA diving businesses. Visiting SCUBA divers are estimated to account for $5 million in direct revenue to SCUBA operators in the Kailua-Kona area.

241. The near-shore coastal waters are connected to, and affected by, the groundwater flow to submarine discharge, seeps and springs in the coastal area.

242. The geography of the shoreline and the unusually shallow offshore waters of the National Park combine to cause a potential reduction in the circulation and flushing of ocean water in the area, which may cause nutrients and contaminants to remain in park waters make the coastal ecosystem more susceptible to adverse impacts of these inputs.

243. Based upon Petitioner's data measuring nutrients at the bottom of the nearshore waters of the National Park, the National Park's waters are already in violation of the State's water quality standards for nutrients, including nitrates, ammonia, and phosphate, and chlorophyll-a and turbidity.

244. While the West Hawaii reefs remain relatively pristine, the majority of coral reef experts worldwide consider human effects such as terrestrial runoff, sewage and nutrient enrichment to be one of the most significant threats facing coral reefs today.

245. Changes in groundwater chemistry composition from runoff and wastewater discharges may affect the structure of marine-life communities in nearshore areas.

246. Many chemicals are toxic when they get into the aquatic environment. Not only can they be deadly, but they can also disrupt reproduction and growth functions. Metals can also cause severe health and reproductive problems in fish and animals and can also cause problems for humans who consume these organisms.

247. Blooms of harmful algae species from added nutrients may be ingested by marine animals causing toxicity to the animal, and toxicity that is passed up the food chain to man.

248. Added nutrients and contaminants may affect the quality of sea turtle foraging habitat.

249. Overabundance of nutrients on coral reefs can cause a shift in marine community structure -- dominance of corals to dominance of algae or other non-coral organisms by displacing new corals and overgrowing corals.

250. Addition of phosphates to reefs may reduce calcification of coral by 50 percent.

251. Nutrient enrichment of coral reefs may have devastating indirect effects, making the community structure vulnerable to additional impacts like disease over-fishing, storms, and contaminant or petroleum spills.

Aquatic Resources – Anchialine Pools

252. The National Park has at least 70 anchialine pools ranging from tiny depressions in the lava to larger ponds, including Aimakapa pond, representing about 10% of all anchialine resources in the State.

253. Anchialine pools are a rare and threatened ecosystem, and Hawaii is the only state in the U.S. to have this ecosystem. The Hawaiian Islands support the greatest concentration of pools in the world; about 89% of those are on the Big Island.

254. The National Park is one of the few coastal areas on the Big Island where these pools are protected from their greatest threat – coastal development that fills in and destroys the pools.

255. Anchialine pools are brackish ecosystems that, by definition, are not directly connected to the ocean but are subject to tidal influence. These pools are typically formed in coastal lava environments where fresh groundwater flows into depressions or openings at the surface of the lava.

256. The definition of anchialine pools, however, says nothing about a specific pool's water quality or the biota supported in the pond. These pools vary in size and type and have no set pattern of response to nutrients or other influences.

257. Some anchialine pools are small in size and have free flowing groundwater running through them. Even if the groundwater has increased nutrients in them, the ponds do not show signs of eutrophication. This means that nutrients are not likely limiting in such systems, rather some other things are limiting the algae growth.

258. Other anchialine ponds are larger, such as Aimakapa, and do not share the special qualities of the smaller anchialine pools. While still an anchialine feature by definition, Aimakapa has begun to fill in with sediment, reducing the rate of groundwater exchange and increasing the sensitivity to increases in nutrient inputs.

259. Smaller anchialine pools are of particular interest in Hawaii because the opae`ula, a small shrimp, are unique to anchialine pools. These shrimps are both a rare species and an important cultural resource for native Hawaiian traditional fishing practices.

260. Historically, because the arid climate of the Kona coast supported no streams or rivers, these anchialine pools provided drinking water for native Hawaiians and others prior to the development of water wells.

261. Anchialine pools provide a freshwater environment for many unique species along an extremely dry coastline. Several species of invertebrates have adapted to the anchialine pool environment, including opae`ula (red shrimp), other crustacean, damselflies dragon flies, and mollusks.

262. Although the National Park's anchialine pools have not been thoroughly surveyed and therefore may contain other candidate or listed species, existing studies show that they support all of the typical anchialine species, as listed above.

263. Although alien fish have been introduced to some of the National Park's anchialine pools, the endemic Hawaiian species have adapted their behavior to avoid these daytime predators.

264. The anchialine pools and the species that they support are susceptible to impacts from changes to their unique ecosystem, including water chemistry changes from added nutrients and contaminants.

Aquatic Resources – Kaloko Fishpond

265. Kaloko fishpond has an area of about 11 acres and is the loko kuapa type of pond, where a natural embayment is separated from the sea by a man made wall. The pond was constructed between 600 and 800 years ago by native Hawaiians with a dry-set stone wall 770 feet long, 25 to 35 feet wide and 9 feet high across the embayment.

266. Because of its direct connection to the ocean through its makaha (sluice gate) and porous wall, Kaloko Fishpond is not an anchialine pond and is mostly seawater.

267. Kaloko fishpond is connected to groundwater through freshwater inflow on the mauka sides of the pond.

268. Kaloko fishpond is one of the most significant cultural features in the National Park.

269. More than 43 species of aquatic fauna have been recorded from Kaloko fishpond, including the very rare shrimp Palaemonella burnsi.

270. Many fish species such as awa (milkfish) and mullet live in the pond.

These fish were historically taken and eaten from Kaloko pond by native Hawaiians, as they are today.

271. Kaloko fishpond provides feeding grounds along the shore for endangered Hawaiian stilts, and migratory and resident shorebirds.

272. The NPS is in the process of restoring the wall and returning Kaloko fishpond to a functioning traditional Hawaiian fishpond. The ultimate goal is to stock the pond and raise edible fish using traditional Hawaiian aquaculture practices.

273. The National Park initiated a 3-year project to remove alien mangrove trees from Kaloko Pond by hand. The project was successful and cost a half a million dollars to restore the natural habitat.

274. Contamination of fish in Kaloko fishpond from mauka development is a major concern for this important cultural and natural resource.

275. Contamination of the fish and other aquatic organisms from metals such as mercury and copper, pesticides, and other toxics can affect hormones and reproduction, long-term survival, and the immune system of fish, or result in the death of the animal.

276. Contamination of fish could render them inedible, thereby destroying the cultural value of the pond.

Aquatic Resources – Aimakapa Fishpond

277. Aimakapa fishpond is the largest and most important wetland along the west coast of Hawaii and is a critically important habitat for endemic endangered waterbirds, migratory waterfowl, and shorebirds. Aimakapa fishpond is a also valuable cultural resource of high importance to native Hawaiians historically and today.

278. Wetlands on the Kona Coast of Hawaii consist of clusters of brackish water anchialine pools surrounded by lava flows, or ancient man-modified wetlands, ponds, anchialine pools, and embayments identifiable as Hawaiian fishponds, all of which experience tidal fluctuations.

279. The U.S. Fish and Wildlife Service considers that "Aimakapa Pond is the most important Kona Coast wetland supporting most of the coots and stilts in the region."

280. Aimakapa pond is the largest fishpond in the National Park, approximately 15 acres. It is a loko pu`uone pond, a natural pond formed by a sand berm impounding groundwater between the ocean and an elevated a'a flow.

281. The National Park is currently revising the management and restoration plan for Aimakapa fishpond and plans to conduct a nesting enhancement study within

the pond to enhance the feeding, nesting, and breeding areas of the pond for endangered waterbirds.

282. Aimakapa fishpond pond is hydrologically connected to the groundwater by numerous springs around the pond edges that supply brackish (slightly salty) groundwater to the pond.

283. Aimakapa Pond is already impacted by industrial development on the Kona Coast as contaminants have been found in the pond's sediment and fish tissues.

284. Aimakapa fishpond is nitrogen limited. That is, inorganic nitrogen is nearly stripped totally from the water (eaten) by the algae in the pond.

285. Water bodies limited in nitrogen are at risk of eutrophication when additional nutrients, such as nitrogen and phosphorus, are added to the water body. This leads to changes in plant and animal communities and, in the National Park, potential impacts to federally protected species and their habitat.

286. Eutrophication is a gradual accumulation of nutrients and organic biomass, accompanied by an increase in production (plants or algae) and a decrease in the average depth of water caused by sediments accumulating on the bottom.

287. Man's activities accelerate the eutrophication process, which causes severe problems for affected bodies of water. This acceleration is brought on by human discharges of organic wastes and/or nutrients, such as nitrogen and phosphorus.

288. Problems caused by eutrophication are: increases in undesirable plant and animal species such as cyanobacteria and harmful or nuisance algae; rapid nighttime drops in oxygen concentrations causing fish and invertebrate kills; overproduction of microscopic plants (phytoplankton and large algae), which reduce water clarity and cause problems with rotting of excess vegetation, and a reduction of species (biodiversity) able to survive in an eutrophic environment thus affecting the food web.

289. Petitioner estimates a 50% increase of added nitrogen to the environment of the National Park from the full industrial build-out mauka of the National Park. This impact will likely be detrimental to the ponds.

290. Additions of nutrients from the proposed mauka development if released into Aimakapa Pond could lead to eutrophication.

291. A simple bioassay test, which can be done in any lab and takes just a few weeks, would show whether the anticipated increase in inorganic nitrogen to the waters of Aimakapa pond would accelerate eutrophication of the pond. Petitioner did not conduct this simple lab test.

292. Rather than performing this test or studying the forms of nitrogen uptake by plants in the pond, Petitioner testified that such information was beyond the scope of their study.

293. One of the central issues for this Petition – examining the impacts of added inorganic nitrogen to the water resources of the National Park – was dismissed as "beyond the scope" of Petitioner's study.

294. There is an absence in the evidence of competent and reliable studies showing that the proposed industrial development would not adversely impact the National Park's resources. Therefore, further potential degradation of Aimakapa fishpond from contamination by upslope activities would potentially hinder this natural and cultural resource and would hinder the National Park's progress in restoration and management of Aimakapa fishpond.

NATIONAL PARK WATER QUALITY

295. The pristine off-shore waters of the National Park are classified "AA;" however, the aquifer in the Kaloko area is classified as an aquifer vulnerable to contamination.

296. Even though the coastal ponds and nearshore waters of the National Park provide important habitat for many fish and wildlife species, the National Park waters presently show adverse impacts from human-caused sources and actions.

297. Contaminants have been found in the pond sediments and fish tissue collected from Aimakapa fishpond in the National Park.

298. Contaminants in the pond include polychlorinated biphenyls, chlorinated benzenes, heptaclohr and other chlordane-related compounds, hlorophenolfenamiphos, dieldrin, mirex, gamma hexachlorocyclohexance, endrin, pentachloroanisole, chlorpyrifos, 2,4'-DDE, 4,4'-DDE, 4,4'-DDD/PCB 114, 2,4'-DDT, and 4,4'DDT.

299. Contaminants in the fish tissue include PCBs, chlorinated benzene compounds, chlordane related compounds, gamma-hexachlorocyclohexane, dieldrin, endrin, heptachlor, anisole, chlorpyrifos, and DDT and its related products. These contaminants reach the pond through groundwater or other means, and then accumulate in the pond sediments and the fish tissue.

300. Additional contaminants were found in the wells located in the National Park, including phenol and metals, such as chromium, copper and zinc.

301. Many of these pollutants are toxic to fish, wildlife and humans.

302. Organochlorine pesticides like chlordane have been shown to be animal carcinogens and they can disrupt hormonal activity and cause reproductive problems.

303. Gamma chlorine pesticides are animal carcinogens that also might disrupt hormonal activity and cause reproductive problems.

304. Mercury can build up in fish tissues and affect predators and humans who eat the fish.

305. Metals such as copper are toxic to aquatic organisms.

306. Contaminants such as pharmaceutical compounds can have a negative effect on the reproductive success of organisms. Compounds such as ethinyl estradiol can interrupt reproduction in fish.

307. In the absence of adequate studies to show that the additional contaminants generated by the new industrial development will not harm the National Park, effective controls on pollution must be in place to contain and treat contaminants to protect the groundwater and the National Park.

Surface Water

308. Surface water consists of rainfall moving over the surface of the land, including waters generated by washing down of parking areas or vehicles, and irrigation.

309. Surface water is a source of polluted runoff or "nonpoint source pollution" because the water carries pollutants from impermeable surfaces such as roads, roofs and parking lots, picking up spills, trash and other contaminants. In a lava environment, this contaminated surface water can quickly leach into the lava towards the groundwater. Significant pollutant types include sediments, nutrients, toxins, floatables, and pathogens.

310. The consequences of nonpoint source pollution are increased risk of disease from water recreation, algae blooms, fish kills, destroyed aquatic habitats, and turbid waters.

311. Industrial contamination, including pesticides and solvents, has been found in groundwater sources in other parts of the State of Hawaii.

312. Most polluted runoff is from people's activities on the land and water, which can and should be prevented through appropriate measures.

313. The most likely form of release from the proposed industrial park is non-point source accumulations such as parking or maintenance area drippings which are washed away by rainfall and percolate into the subsurface.

314. The USGS Study shows that the National Park has already been impacted by industrial development on the Kona Coast, finding contaminants in groundwater, pond sediments, and fish within the National Park.

315. Petitioner's engineers did not consult the State of Hawaii's Implementation Plan for Polluted Runoff Control while developing plans for the proposed development's wastewater disposal, surface water runoff, and pollution prevention plan.

316. The 1997 USGS study of the National Park's groundwater cannot be relied upon to support a finding that the existing industrial development has not adversely impacted the National Park.

317. The author of the USGS study, Dr. Oki, denies that his study, which is a one time sampling event of groundwater, may be relied upon as a "field test" of pollution released from the existing industrial development.

318. A single sample collected in 1997 cannot be relied upon to make any conclusions about the state of groundwater contamination in the National Park in 2001.

319. Untreated surface water from the industrial development will potentially impact National Park resources by contaminating the groundwater that reaches the Park's ponds and coastal areas.

320. Control of contaminated surface water can be achieved through the development of a Pollution Prevention Plan ("PPP") designed to address all pollutants associated with industrial development and to identify measures that will contain and treat such pollutants in order to prevent any release into the environment, including the groundwater.

321. In order to protect the National Park makai of the proposed industrial development, the PPP should focus on structural Best Management Practices ("BMPs"), particularly in roadways and gutters to contain surface runoff. BMPs are measures,

controls, and devices used to prevent pollution from being discharged into waters such as rainwater and surface water and then carried into streams, ponds, and oceans.

322. This site has essentially no soil, and underlying lava formation is highly permeable making it easy for organics and petroleum products to reach groundwater and ultimately discharge into the anchialine pools and Kaloko Fishpond within the National Park.

323. These BMPs should include storage and handling on impervious (paved) surfaces, containment of stormwater runoff, and appropriate treatment (such as oil-water separators and lined neutralization ponds) before discharge.

GROUNDWATER RESOURCES

324. Contaminants that could impact the National Park's resources include, but are not limited to solvents, non-soluble pesticides, pharmaceutical compounds, soluble petroleum compounds, metals, and toxic combinations of metals and nutrients.

325. Even though petroleum based-products may get stuck on rock matrix, some constituents can dissolve into the flowing water stream.

326. Although Petitioner's expert alleged that data exists to support the theory that a huge petroleum spill would not reach the National Park, no such data or documentation was presented as evidence before the Commission.