

Hualapai Waste Lagoons

By: (P2BK)

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Site

- ▶ Location:

- ▶ Peach Springs, AZ (Hualapai Nation)

- ▶ Population:

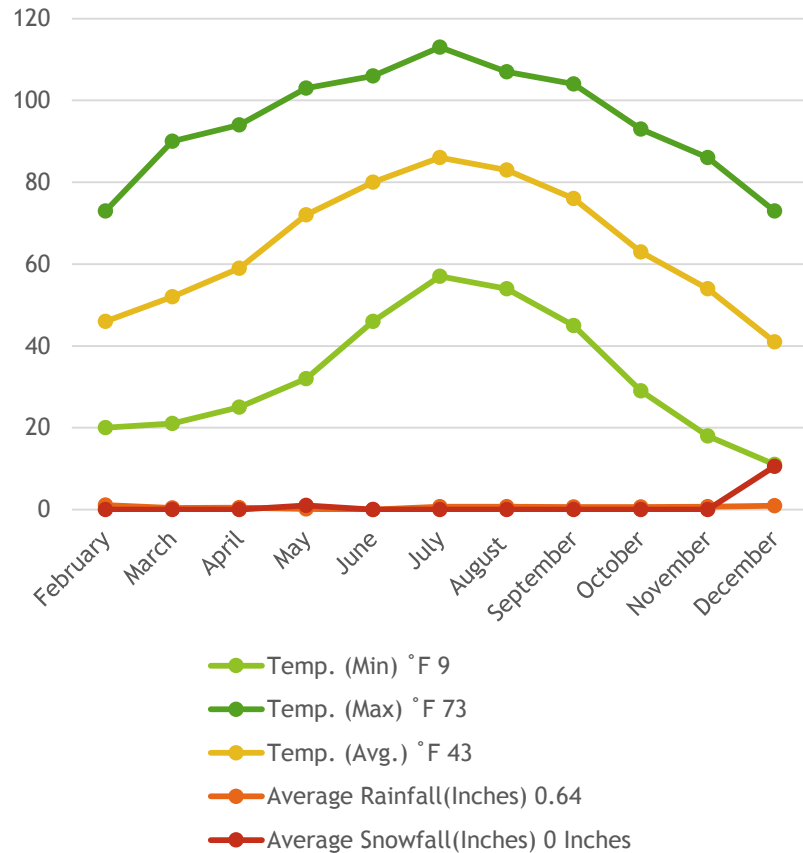
- ▶ 1,090 (Year 2010).

- ▶ 5 Lagoons.



Weather at Peach Springs

Climate at Peach Springs



Month	Temp. (Min) °F	Temp. (Max) °F	Temp. (Avg.) °F	Average Rainfall(Inches)	Average Snowfall(Inches)
January	9	73	43	0.64	0 Inches
February	20	73	46	1.1	0
March	21	90	52	0.35	0
April	25	94	59	0.44	0
May	32	103	72	0.13	1
June	46	106	80	0.02	0
July	57	113	86	0.69	0
August	54	107	83	0.71	0
September	45	104	76	0.61	0
October	29	93	63	0.6	0
November	18	86	54	0.67	0
December	11	73	41	0.97	10.56

Project Purpose

- ▶ Study the algae of the lagoons at Peach Springs, Arizona
- ▶ Convert algae waste into biodiesel
- ▶ Create new source of energy that is safer to the environment



Technical Consideration

▶ Algae Growth Conditions:

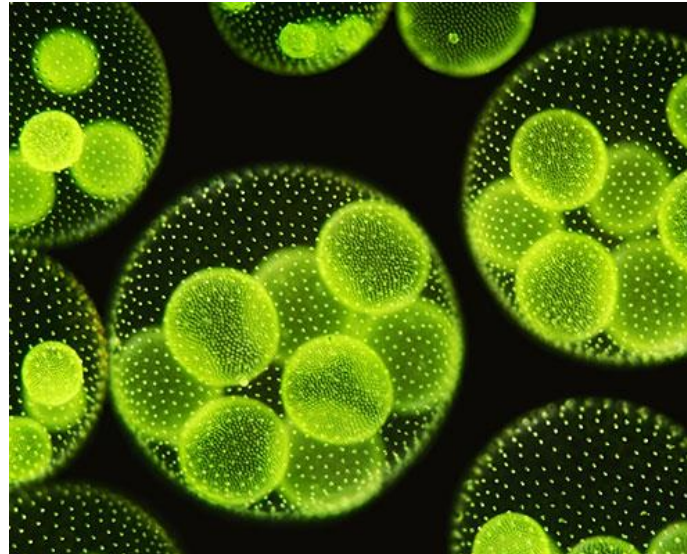
- ▶ Light
- ▶ pH
- ▶ Aeration
- ▶ Mixing
- ▶ temperature
- ▶ Salinity

▶ Best Type of Algae:

- ▶ Microalgae ←
- ▶ Macroalgae

Why Microalgae?

- ▶ Microalgae are typically the best type of algae to extract lipids and convert it to biodiesel because:
 - ▶ produces large amounts of lipids
 - ▶ Has a fast grow rate



Potential Challenges

- ▶ Unknown type of algae
- ▶ Not sufficient type of algae in the site
 - ▶ Find solution!
- ▶ Best Algae type
 - ▶ Suitable for the site.



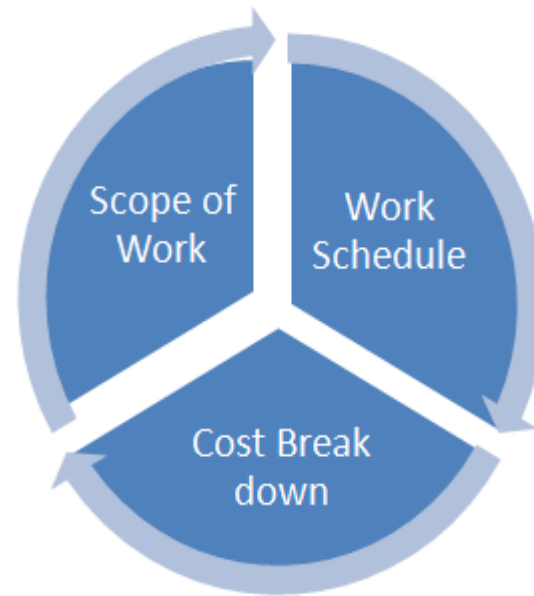
Stakeholders

- ▶ Hualapai Nation



Scope of Work

- ▶ **Algae Characterization**
 - ▶ Identifying algae specie
 - ▶ Algae Production Quantities
- ▶ **Algae Harvesting Options**
- ▶ **Algae Processing Options**
- ▶ **System Final Design**
- ▶ **Project Management**
 - ▶ Client and Team Communication
 - ▶ Deliverables



Harvesting & Processing Options

▶ Harvesting

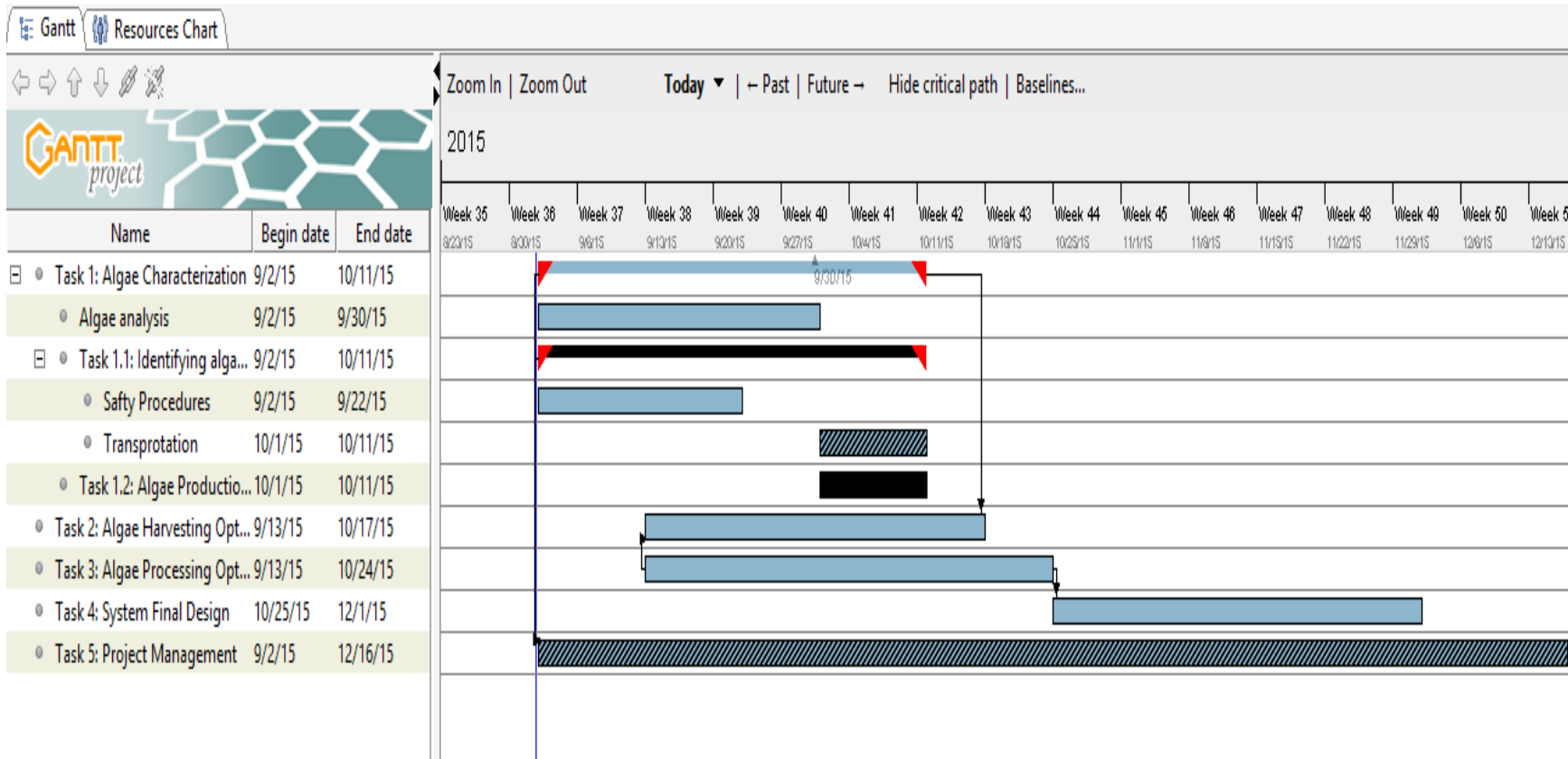
- ▶ Open Ponds
- ▶ Photobioreactors



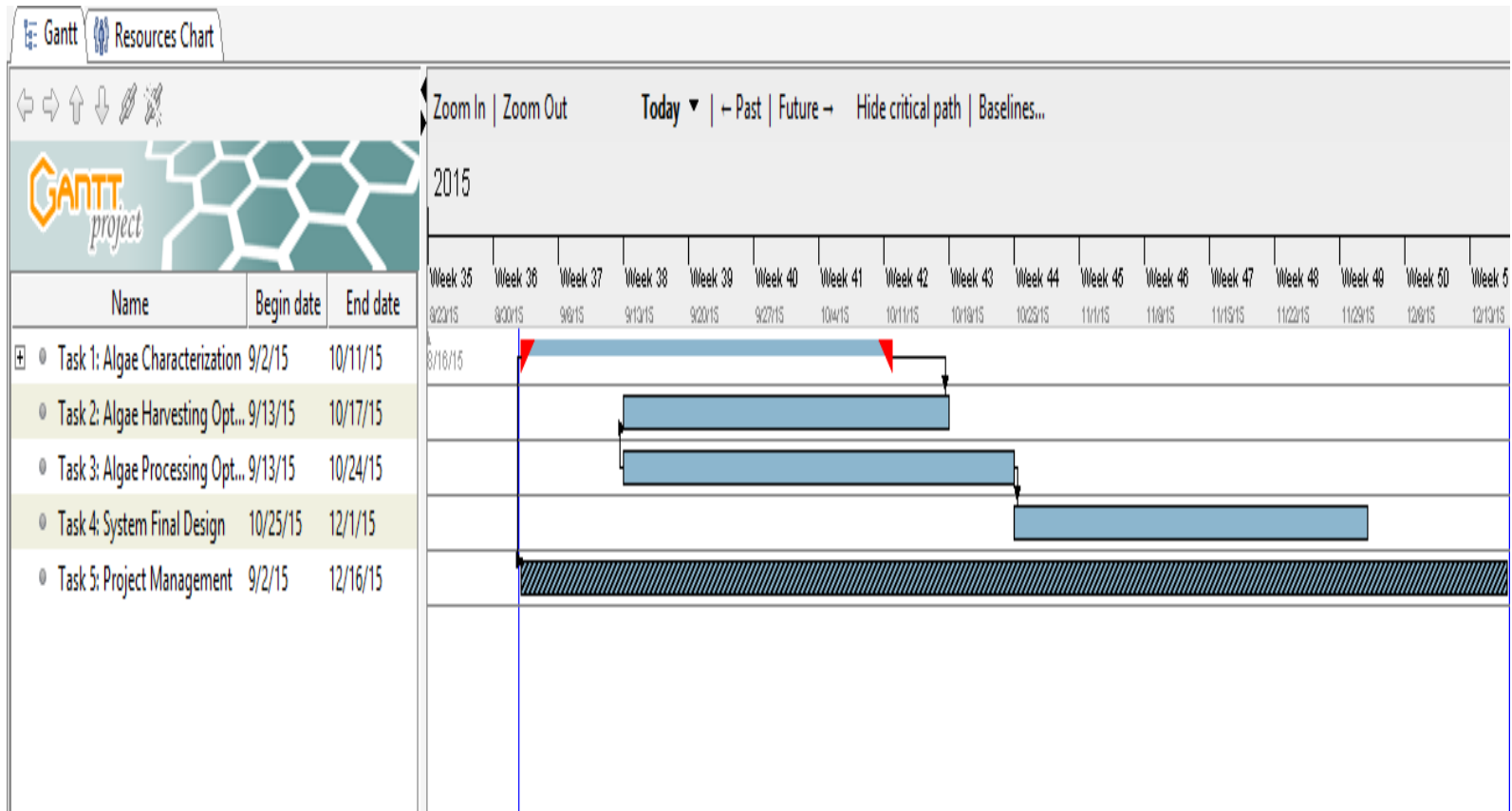
▶ Processing

- ▶ Turning algae extractions into biofuel 3 Methods:
 - ▶ Chemical Transesterification
 - ▶ Enzymatic Conversion
 - ▶ Catalytic Cracking

Work Schedule



Work Schedule



Cost Break Down

Task	SENG,hr	ENG,hr	Lab Technician,hr
1.0 Algae Characterization	0	40	100
2.0 Algae Harvesting Options	30	60	0
3.0 Algae Processing Options	30	60	0
4.0 Project Management	30	40	60
Total for each personnel	90	200	160

(A) Personnel working hours

(B) Total cost of project

13(Abdul)

Cost Break Down

Item	Classification	Hours	Rate \$/hr	Cost
1.0 Personnel	SENG	90	130	\$11,700
	ENG	200	71	\$14,200
	LAB	160	50	\$8,000
	Total Personnel			\$33,900
2.0 Analytical supplies	Glassware, PPE, filters and microscope			\$1,000
3.0 Travel	2 trips, 226 miles/trip	\$0.4/mile		\$181
	2 days vehicle rental \$55/day			\$110
	3 persons per diem, \$34/day			\$204
	Total Travel			\$495
Project Total				\$35,395

(A) Personnel working hours

(B) Total cost of project

14(Abdul)

References

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Questions?

