Draft Chapter 8 Implementation Costs

Presentation to

BDCP Steering Committee

July 15, 2010

Cost Analysis Objectives

- ESA and NCCP Funding Assurances Requirements
- Identify Costs by Plan Element
  - Water Facilities
  - Habitat Restoration and Protection
  - Other Stressors
  - Monitoring, Adaptive Management, Changed Circumstances, Program Administration
- Identify BDCP Funding Needs
- Support Funding Allocation Discussions

Chapter 8 Chronology

- Steering Committee Presentations
  - Aug 2009: Annotated Chapter Outline
  - Nov 2009: 1st Draft Chapter (partial, ~30%)
  - Dec 2009: 2nd Draft Chapter (partial, ~50%)
  - July 2010: 3rd Draft Chapter (partial, ~80%)
  - *Sep 2010: 4th Draft Chapter (complete)*

Key Changes from Dec 2009

- Reflects SC Jan 29, 2010 direction on CMs to include in Effects Analysis
- High/Low Costs for Pipeline/Tunnel and East Canal options
- Costs for All Habitat Restoration & Terrestrial CMs
- Reorg of Other Stressors CMs
- Revised Assumptions for Land Costs

Chapter 8 Outline

- Introduction
  - Scope, Objectives, Organization
- Common Assumptions
  - Financial, Land Value, Labor Rates, Contingency
- Estimated Costs
  - Water Facilities
  - Other Stressors
  - Tidal & Floodplain Habitat Restoration
  - Terrestrial Habitat Restoration, Protection, Management
  - Monitoring, Adaptive Mgt, Changed Circumstances, Admin
- Summary of BDCP Costs (not in this draft)
- Funding Sources and Assurances (not in this draft)
- Net BDCP Costs (not in this draft)

Common Assumptions

- Temporal: 5-Year Cost Increments
- Financial: 2009 Dollars; USBR/USACE Discount Rate Guidance; OMB Circ. A-94 Inflation Rate Forecast
- Land Value:
  - ROAs – Based on County Assessment Records (adjusted for market conditions since date of assessment)
  - Broader Delta (CZs) – Based on 2009 CSFMRA Trends in Agricultural Land and Lease Values
  - Surface Easement – 60% of Fee Value
  - Subsurface Easement – 40% of Fee Value
- Labor Rates: Based on FY08-09 Natural Resources Agency Salary Scales
- Contingency: 20% unless explicitly stated

Pipeline/Tunnel Costs

- Includes: Design, PM, CM, Construction, Contingency, Land Acquisition, Annual O&M (being revised)
- Construction/Operating Estimates from DHCCP (low) and 5RMK (high)
- Cost Details
  - Design, PM, CM assumed to be 18% of construction cost.
  - Construction costs based on 10% design level
  - Construction labor costs based on prevailing wages as published by the California Department of Industrial Relations
  - Construction equipment costs based on ownership and operating costs as published by the USACE.
  - Costs for major materials based on budgetary quotes received from U.S. vendors.
  - Contingencies are 35% for tunneling elements and 25% for all other construction elements.
  - The construction cost estimate has Class 3 estimate quality, as defined by the Association for the Advancement of Cost Estimating International Practices.
  - Land Costs based on hypothetical footprint and land value common assumptions

Pipeline/Tunnel Costs

Cost Item	*Low (Millions)*	*High (Millions)*
Construction		
Design, Project & Construction Management	$1,607	$1,826
Direct Construction	$6,768	$7,633
Subsurface Construction Contingency	$1,641	$1,985
All Other Construction Contingency	$519	$497
Total Construction	***$10,537***	***$11,973***
Land Acquisition	***$102***	***$102***
Annual Operating Cost (mil. $/yr)*	***$35.4***	***$35.4***

**O&M costs being revised*

Timing of Pipeline/Tunnel Costs

Low Cost	Total Cost for Water Facility and Operations										Total Cost
	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	
Intake and Conveyance Facilities	7,238	3,299	0	0	0	0	0	0	0	0	10,537
Land Acquisition	102	0	0	0	0	0	0	0	0	0	102
Energy	0	54	109	109	109	109	109	109	109	109	926
O&M	0	34	69	69	69	69	69	69	69	69	586
Total Cost	7,340	3,387	178	178	178	178	178	178	178	178	12,151
Running Total	7,340	10,727	10,905	11,083	11,261	11,439	11,617	11,795	11,973	12,151	12,151

High Cost	Total Cost for Water Facility and Operations										Total Cost
	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	
Intake and Conveyance Facilities	8,224	3,749	0	0	0	0	0	0	0	0	11,973
Land Acquisition	102	0	0	0	0	0	0	0	0	0	102
Energy	0	54	109	109	109	109	109	109	109	109	926
O&M	0	34	69	69	69	69	69	69	69	69	586
Total Cost	8,326	3,837	178	178	178	178	178	178	178	178	13,587
Running Total	8,326	12,163	12,341	12,519	12,697	12,875	13,053	13,231	13,409	13,587	13,587

Tidal Habitat Restoration (CM 10)

- Land costs based on hypothetical restoration footprints by ROA
- Habitat construction costs estimated by PWA, Inc., and include
  - Design, PM, CM, mass grading, temporary and permanent levee construction, other construction elements, veg. establishment, contingency (35%)
  - High and Low costs differ by extent of mass grading and fill required (primarily in West Delta ROA)

CM 10 Created Habitat Under Low and High Cost Scenarios

	Habitat Area (acres)			
	Tidal Marsh	**Subtidal**	**Upland**	**Total**
Low Cost Scenario	14,500	33,000	17,500	65,000
High Cost Scenario	29,000	26,500	9,500	65,000

The acreage footprints are derived from hydrodynamic modeling for a July 2002 base period. Tidal habitat is defined as the area between mean lower low water (MLLW) and mean higher high water (MHHW). Subtidal habitat is defined as the area below MLLW. Other habitat includes areas which are currently within intertidal elevations, but would be above high tides, based on the modeling predictions, once restoration is complete.

CM 10 Construction Cost Estimate

Cost Component	Low Cost Estimate	High Cost Estimate
Mass Grading Costs	$ 35,279,000	$ 234,012,000
Long-term Levee Costs	$ 333,312,000	$ 333,312,000
Temporary Levee Costs	$ 236,464,000	$ 236,464,000
Other Restoration Costs	$ 235,698,000	$ 239,140,000
Subtotal Construction Costs	**$ 840,753,000**	**$ 1,042,928,000**
Cost Uncertainty (15%)	$ 126,113,000	$ 156,439,000
Site Specific Factors (20%)	$ 168,151,000	$ 208,586,000
Total Construction Costs	**$ 1,135,017,000**	**$ 1,407,950,000**
Related Costs		
Permitting, Survey & Design (20%)	$ 227,003,000	$ 281,589,000
Construction Administration (7%)	$ 79,451,000	$ 98,557,000
Vegetation Establishment (3%)	$ 34,051,000	$ 42,239,000
Grand Total	**$ 1,475,522,000**	**$ 1,830,335,000**

CM 10 Construction Cost per Acre

ROA	Tidal Habitat Construction Cost Per Acre	
	Low Cost Estimate	**High Cost Estimate**
Cache	$16,000	$26,000
Suisun Marsh	$12,000	$12,000
South Delta	$26,000	$30,000
Cosumnes-Mokelumne	$20,000	$20,000
East Delta	$32,000	$34,000
West Delta	$67,000	$84,000
Average for All ROAs*	***$22,300***	***$27,700***

*Average for all ROAs is an acreage-weighted average and therefore does not equal the simple average of ROA per acre costs.

Total Costs for CM 10

Low Cost	Total Cost for Tidal Marsh Habitat Creation Per Cost Period (Millions)										Total Cost
	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	
Land Acquisition	71.7	71.7	151.0	130.3	130.3	130.3	130.3	130.3	0.0	0.0	946.1
Construction	137.1	137.1	305.3	179.2	179.2	179.2	179.2	179.2	-	-	1,475.5
Total	208.8	208.8	456.3	309.5	309.5	309.5	309.5	309.5	0	0	2421.6
Running Total	208.8	417.6	873.9	1183.4	1492.9	1802.4	2111.9	2421.4	2421.4	2421.4	2421.4
High Cost	**Total Cost for Tidal Marsh Habitat Creation Per Cost Period (Millions)**										**Total Cost**
	1-5	**6-10**	**11-15**	**16-20**	**21-25**	**26-30**	**31-35**	**36-40**	**41-45**	**46-50**	
Land Acquisition	71.7	71.7	151.0	130.3	130.3	130.3	130.3	130.3	0.0	0.0	946.1
Construction	160.1	160.1	444.3	213.2	213.2	213.2	213.2	213.2	0.0	0.0	1,830.3
Total	231.8	231.8	595.3	343.5	343.5	343.5	343.5	343.5	0	0	2776.4
Running Total	231.8	463.6	1058.9	1402.4	1745.9	2089.4	2432.9	2776.4	2776.4	2776.4	2776.4

CM 6: Non Native Predator Control

Delta Non-Native Predator Hot Spot	Assumptions for Cost Estimate
1. Old structures in or hanging over Delta waterways, such as pier pilings or other artificial structures, that are no longer functional or have been abandoned but affect flow fields and provide shade	Up to 20 structures removed per year
2. Vessels that have been abandoned throughout the Delta	Up to 10 vessels removed per year
3. New intake structures of the North Delta Diversions	Daily predator harvest using large purse seine nets at 5 locations from October through May.
4. The deep hole just downstream of the Head of Old River in the San Joaquin River	Daily predator harvest using large purse seine nets at 1 location from October through May.
5. Specific locations in Georgiana Slough, as identified by fishery agencies	Daily predator harvest using large purse seine nets at 3 locations from October through May.
6. Specific locations in Sutter and Steamboat sloughs, as identified by fishery agencies	Daily predator harvest using large purse seine nets at 4 locations from October through May.
7. Release sites of salvaged fish from CVP/SWP facilities	Weekly predator harvest using large purse seine nets at 4 locations from October through May.

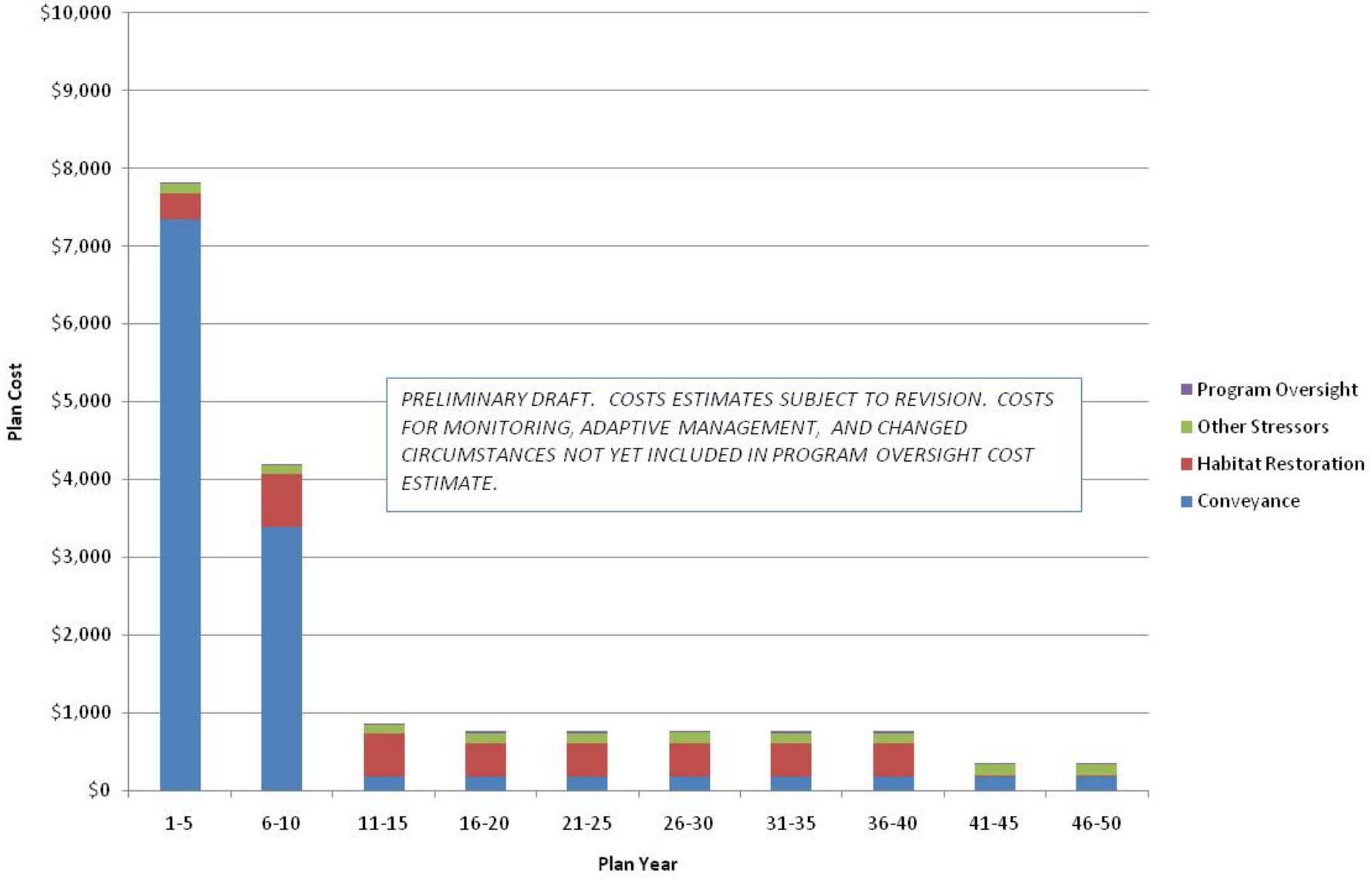
CM 6 Cost Assumptions

- Boat and structure removal costs based on existing removal programs run by DBW and Contra Costa County Sheriff's Department
- Focused predator control costs built up from assumptions for
  - Number of control sites (previous slide)
  - Vessel & equipment acquisition and O&M
  - Vessel crew size and wages
  - Contingency

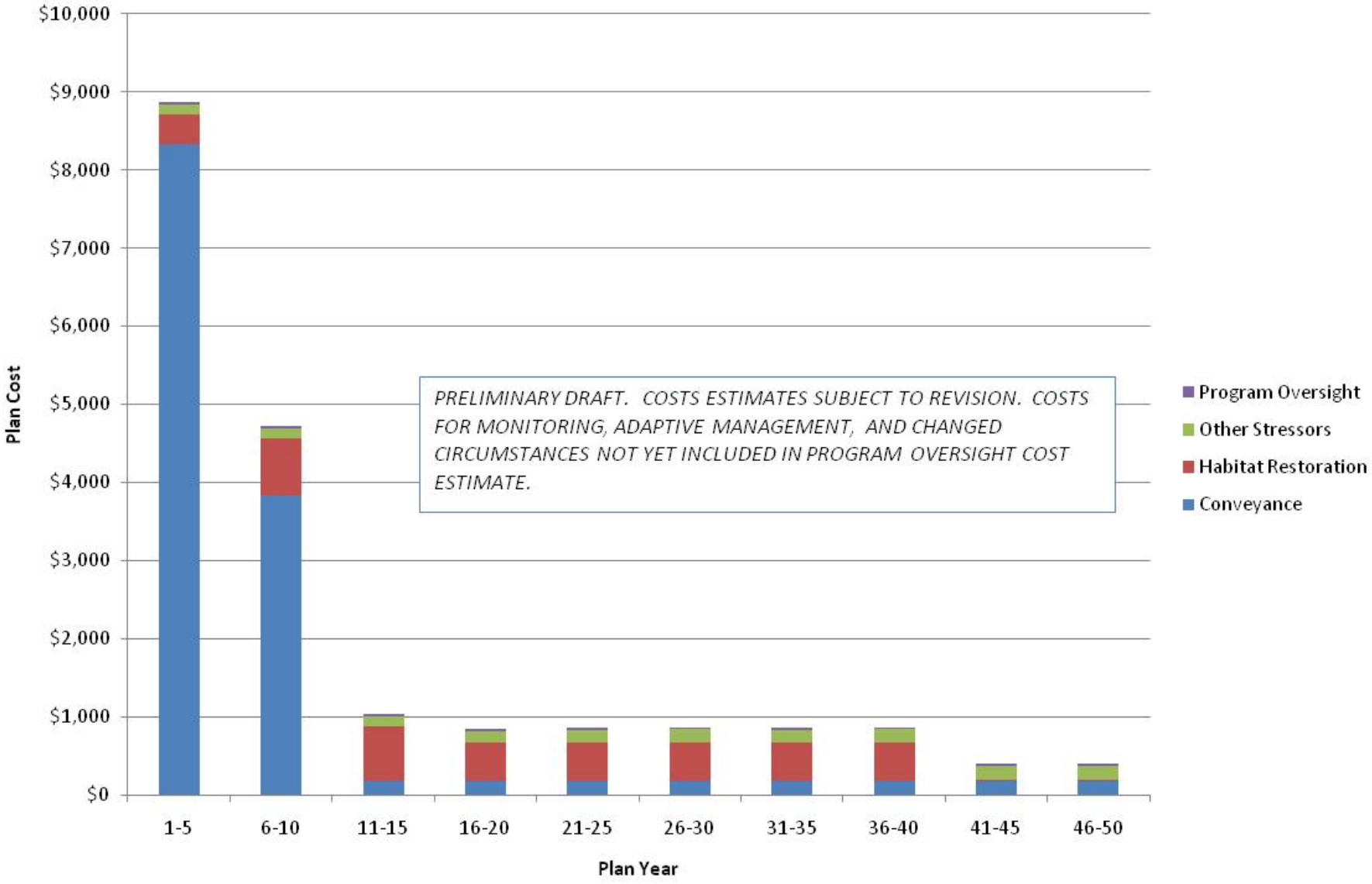
Total Costs for CM 6 Non Native Predator Control

Costs by Period (mil. $)	*Cost Period*										*Total Cost*
	1-5	**6-10**	**11-15**	**16-20**	**21-25**	**26-30**	**31-35**	**36-40**	**41-45**	**46-50**	
Hot Spot Pred. Control	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	36.2
Vessel Removal	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.8
Structure Removal	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	9.4
Total Costs	**4.7**	**4.7**	**4.7**	**4.7**	**4.7**	**4.7**	**4.7**	**4.7**	**4.7**	**4.7**	**47.4**
Running Total Costs	**4.7**	**9.5**	**14.2**	**19.0**	**23.7**	**28.4**	**33.2**	**37.9**	**42.7**	**47.4**	**47.4**

BDCP Costs in Five-Year Increments - Low Estimate (millions of 2009 dollars)



BDCP Costs in Five-Year Increments - High Estimate (millions of 2009 dollars)



Plan Elements Not Yet Estimated

- CM 8: Methylmercury at Restoration Sites
- Adaptive Management Program*
- Monitoring and Research Program*
- Changed Circumstances*

* Need these from SC in order to do costing

Next Steps

- Comments on 3rd Draft at July 29, 2010 SC mtg
- Seeking Comments On
  - Cost estimation methods
  - Unit costs and other assumptions used to estimate CM costs
  - Information sources that could improve estimates
- Changes to CMs by SC could require revisions to cost estimates
- Full Draft Chapter September 9, 2010