FUNCTIONAL SPECIFICATIONS

CRDC 297 – EBMP

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eBMP - Functional Specifications

CRDC 297 – COTTON BEST MANAGEMENT PRACTICES (EBMP)

INTRODUCTION

This document provides and overview of design and functionality of the Cotton Best Management Practices eBMP project. This project has arisen from a number of opportunities for improvement in the implementation of the Cotton Industry's Best Practices program (BMP). These are to;

- Develop cost effective ways of distributing updates to the BMP manual content.
- Enable industry staff to have access to an 'electronic' auditing system for conducting Pre-certification assessment, Certification assessment and;
- Allow cotton growers, managers the ability to conduct their annual self assessment declarations 'electronically'.
- Better link BMP to research
- Monitor Practice Change

WHAT IS EBMP?

eBMP is a system for relevant stakeholders to implement the cotton industry's best management practices program. The BMP program is underpinned by best practice research and as such the system has the ability to interact and integrate this research to make it available to the user. The eBMP system allows the relevant stakeholders to fulfil the auditing requirements of the BMP program as well as have then ability to monitor practice change within the industry.

EBMP – USERS

The eBMP system has a range of users, these are;

- Cotton Grower
- Cotton Australia Grower Services Managers
- Best Management Practices (BMP) Implementation Officers
- Researchers
- Other interested industry people
- The public

EBMP – MEASUREMENTS OF SUCCESS

The eBMP CRDC 297 projects' success can be measured by the following parameters;

- Completion of the application and web components to the project requirements
- The number of GSM and BMP IO officers using it to conduct PCA assessments.
- The number of growers able to complete their ASAD (Annual Self Assessment Declarations On-line).
- Ability to monitor practice change by tracking action plan completions.
- Ability to monitor industry performance indicators through collation of user data.

EBMP DESCRIPTION

WHAT THE EBMP APPLICATION WILL DO.

The eBMP system is made up of 2 components; the web based component and the windows based component that is stored on the users' machine. The two can operate independent from each other or co-dependently.

- Web Application
  - Display interactive BMP manual content
  - Enable research to be linked to content.
  - Enable the user to search the content.
  - Allow for up-to-date BMP content
  - Allow for BMP reports, including practice change (Differences in worksheet rankings by year, region and industry)
- Windows application
  - Display interactive BMP manual content
  - Enable research to be linked to content.
  - Auditing – Pre-certification assessments, certification assessments, annual self-assessment declarations and reports
  - Allow for updates to BMP content

How this is achieved and how the user interacts with these processes will be outlined in this document.

EBMP DESIGN USER REQUIREMENTS

The design concept is based on what functionality is required by the different users outlined above.

GROWER SERVICES MANAGERS (GSM) AND BMP IMPLEMENTATION OFFICERS (BMPIO) REQUIREMENTS

- Interactive BMP manual content linked to research
- Conduct pre-certification assessments (PCA) electronically
- Review PCA's conducted previously
- Store PCA's and send them to the BMP audit office for scrutineering
- Write BMP action plans that are related to a worksheet
- Review any action plans that are yet to be completed
- Have access to templates/tools/research that assists growers to complete their action plans.
- Reports on action plan implementation
- Reports on valley and industry averages of worksheets
- Reports on opportunities for improvement to focus resources
- Reports on practice change

COTTON GROWERS / BMP MANAGERS REQUIREMENTS

- Interactive BMP manual content linked to research
- Conduct ASAD (annual self-assessment declarations)
- Review their action plans and tick when completed
- Add new action plans
- Have access to templates/tools/research that assists growers to complete their action plans.
- Reports on action plan implementation
- Reports on valley and industry averages of worksheets
- Reports on opportunities for improvement to focus resources
- Reports on practice change

RESEARCHERS AND COTTON INDUSTRY

- Interactive BMP manual content linked to research

- Reports on valley and industry averages of worksheets
- Reports on opportunities for improvement to focus resources
- Reports on practice change

PUBLIC

- Interactive BMP manual content linked to research

MONITORING PRACTICE CHANGE

One of the major functions required by the eBMP project is to have the ability to monitor practice change. To do this the eBMP database has the facility to store groups of "common indicators and practices". Some of these are listed in table 2

TABLE 2: COMMON INDICATORS AND PRACTICES

ID	Practice Change Indicator or Item	Unit	Comments
1	Nitrogen Use	kg/ha	
2	Nitrogen Use	kg/bale	
3	Soil Carbon	%	
4	Exchangeable Sodium % 0-15 cm	%	
5	Exchangeable Sodium % 0-30 cm	%	
6	Exchangeable Sodium % 30-60 cm	%	
7	Exchangeable Sodium % 60-100 cm	%	
8	ESP Profile (+ [increasing], 0 [Steady], -[Decreasing]) Trend [Past 5 years]	Trend	
9	Endosulfan Use % Reduction Last 5 Years	%	
10	Area of cotton grown	ha	
11	Yield of cotton (Total Bales)	Bales	
12	Evapotranspiration (mm)	mm	
13	In-crop rainfall (mm)	mm	
14	Most Significant Weed	Common Name	
15	EC (1:5) 0-15 cm	dS/m	
16	EC (1:5) 15-30 cm	dS/m	
17	EC (1:5) Trend [Past 5 years] (+, 0, -)	Trend	
18	Precision Farming Used (if Yes Type)	Type	For example; GPS guidance, variable rate technology, other.
19	Soil Carbon Trend [Past 5 years] (+,0,-)	Trend	(+ = increasing, 0 = steady, - = decreasing)
20	Precision Farming [Past 5 Years] (+,0,-)	Trend	(+ = increasing, 0 = steady, - = decreasing)
21	Nitrogen Determination (How it is determined? S, LP, FH, O, Y)	Description	(S = soil tests, LP = Leaf/Petiole Tests, FH = Field History, O = other, Y = Yield Target (kg of N/bale/ha)
22	Soil Sampling - Number of years you have been soil sampling	Years	
23	Sodium Adsorption Ratio [SAR] (Water Samples) - BORE	Ratio	
24	SAR 5 Year Trend (+,0,-)	Trend	
25	Storage Losses Calculated (Yes/No)	Yes/No	

26	Evaporation Losses From Storage (mm) - Estimated	mm	
27	Deep Drainage Losses From Storage (mm) - Estimated	mm	
28	Irrigation Scheduling - How is it done	Type	Crop Growth Rates, Neutron Probe, Capacitance Probe, Shovel, Infared Gun, Pressure Bomb, ET/crop factors
29	Estimated PAWC (Plant Available Water Content)	mm	Average across farm
30	Irrigation Systems - Drip	%	% of drip irrigation (ha basis)
31	Irrigation Systems - Centre Pivot	%	% of centre pivot irrigation (ha basis)
32	Irrigation Systems - Lateral Move	%	% of lateral move irrigation systems (ha basis)
33	Irrigation Systems - Furrow	%	% of furrow irrigation (ha basis)
34	Property Size	ha	
35	Irrigation Area	ha	
36	Dryland Area	ha	
37	Grazing Area	ha	
38	Riparian Area	ha	
39	Area cleared in last 5 years	ha	
40	How is your native vegetation and riparian areas managed	type	Used for grazing (G) Fenced, Selectively Grazed (FSG), Fenced, No Grazing (FNG), Farmed (F), Control Pests and Weeds (CPW)
41	Is Biodiversity Assessed	Type	Monitor Birds (B), Monitor Other Native Animals (A), No Monitoring (N), Other (O)
42	Total Water Pumped From a Bore	ML	
43	Total Water Pumped From a River	ML	
44	Total Water Pumped From Channel System	ML	
45	Volume of water in on-farm storage at planting (ML)	ML	
46	Enter volume of water in on-farm storage at harvest (ML)	ML	
47	Enter volume of on-farm water harvested in-season (ML)	ML	
48	Enter volume of water used on other crops (ML)	ML	
49	Enter total in-season rainfall (mm)	ML	
50	Enter run-off (mm) or estimate effective rain at O below (see WATERpak Ch2.1)	mm	
51	Enter used soil water reserve (average of all fields) (mm)	ML	
52	Enter total seasonal crop evapotranspiration (mm)	mm	

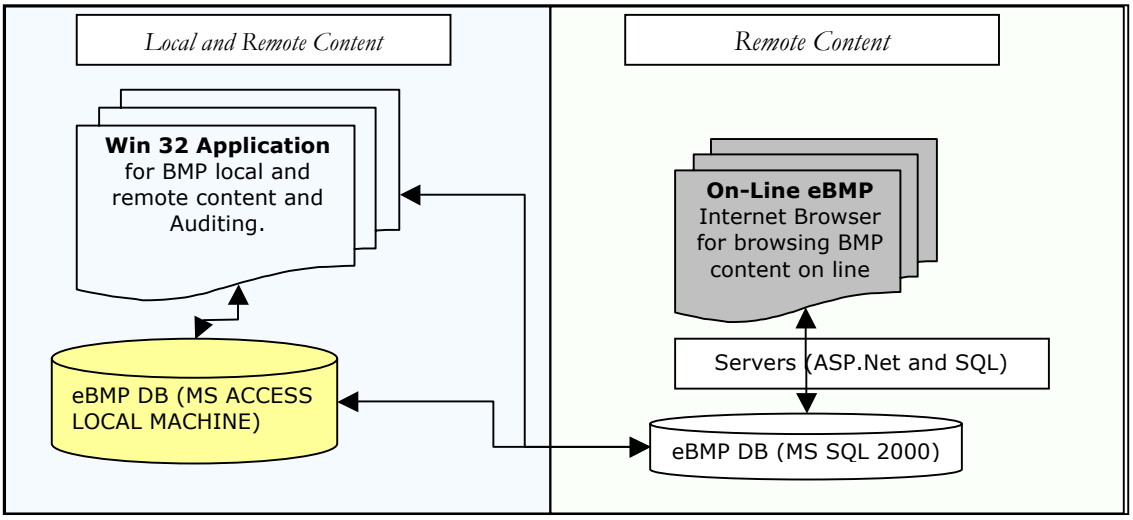
It is important to note that this document is not a static document. As part of the project users will have the opportunity to provide feedback to improve the system.

APPLICATION ARCHITECTURE

The eBMP system is composed of two main parts; a web component and the windows application.

Each part is linked to an information store (MS SQL 2000 DB for the web component and MS ACCESS DB) for the windows application content. This relationship is represented diagrammatically in figure 1.

Figure 1 eBMP Design Overview



BMP content is stored in the database as text and rendered onto the web page as the user requests the page. This process allows the content to be easily managed and updated.

WEB/ONLINE COMPONENT

The online component is built using the ASP.Net framework linked to a MS SQL 2000 database. This design allows content to be updated in the database and update automatically on the web pages.

Web/Online Architecture

The online component architecture is a 3 tiered model.

Tier 1 consists of the web pages.

Tier 2 consists of the code behind and data access classes as well as classes used for some of the online tools.

Tier 3 consists of the MS SQL 2000 database, each tier is described further in this document.

TIER 1: USER INTERFACE

Tier 1 is the web pages for the site. Their name and functionality are listed below;

1) BMP Home Page – featured bmp stories and relevant bmp information

2) BMP Manual Content Page – Index and content of all BMP modules

3) BMP Manual Worksheets Page – Index of worksheets within a module as well as individual worksheets. Links to templates and other research content are in this page.

4) BMP Resources Page – Links to resources such as BMP templates, on-line tools and contacts

5) BMP Templates – Access to templates used in the implementation of BMP

6) BMP On-line tools – Water Use Efficiency Indices, Nitrogen, Nozzle Selection Tools

7) BMP Contacts – List of contacts relevant to BMP.

8) BMP Audits – Links to relevant audit section as well as documents relating to audit processes

9) BMP PCA – Section for updating, deleting, creating a new BMP PCA, as well as process for approval by scrutineer and "locking the document in" once scrutineered.

10) BMP CERTIFICATION - Section for updating, deleting, creating a new BMP Certification Assessment, as well as process for approval by scrutineer and "locking the document in" once scrutineered.

11) BMP ASAD – Section for conducting/editing annual self assessment declarations.

12) BMP – Administration – Controls permissions of users, members and page access)

13) BMP User Information Page – Information for users to update, delete and add their details including farm information.

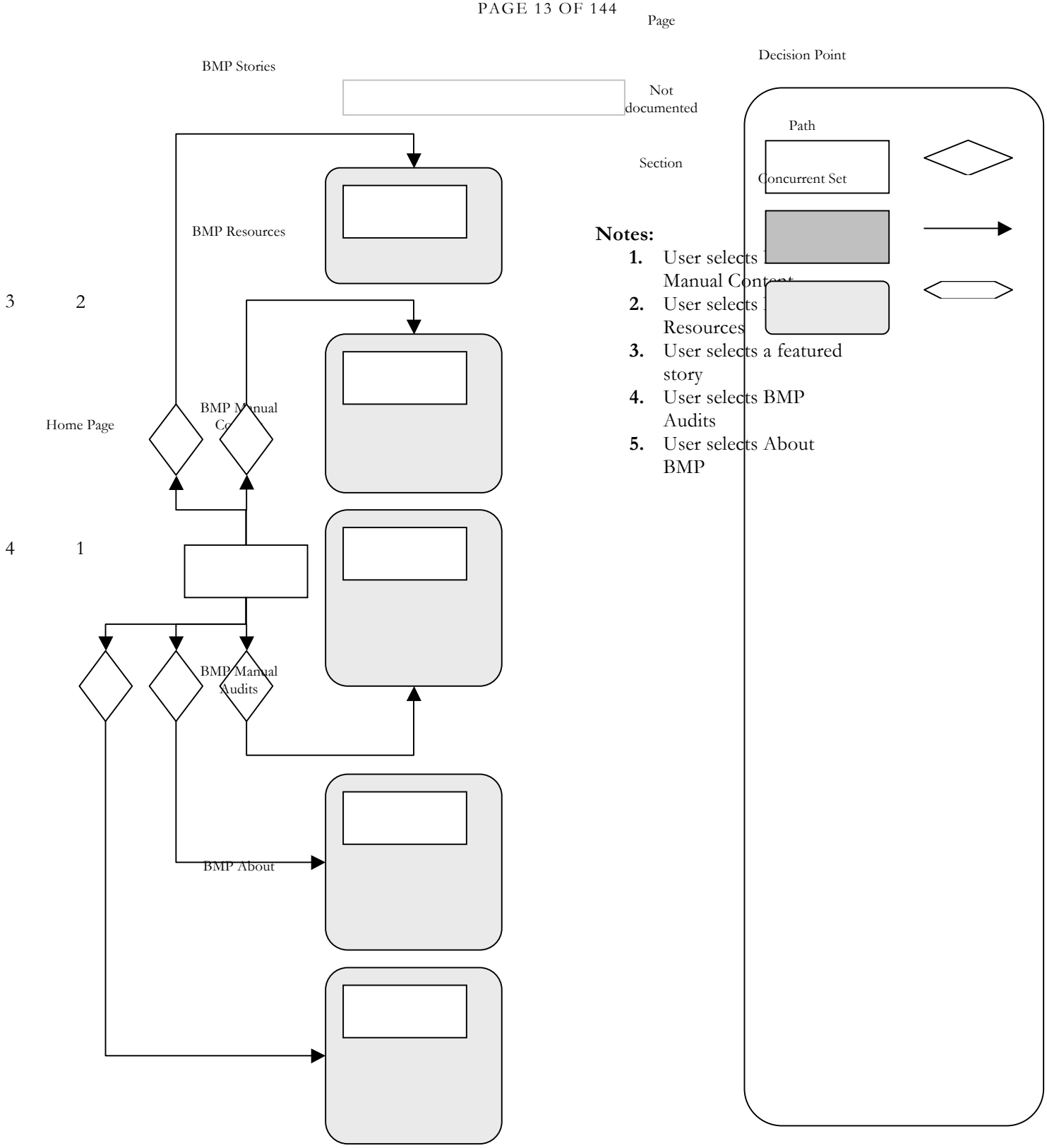
14) BMP Register Page – Allow a non-user to register for access to online auditing.

15) BMP Reports Page – Reports on Individual worksheet practice change.

16) BMP Administration Section: Allows an administrative user the ability to change the content of the database, manage updates and eBMP communications.

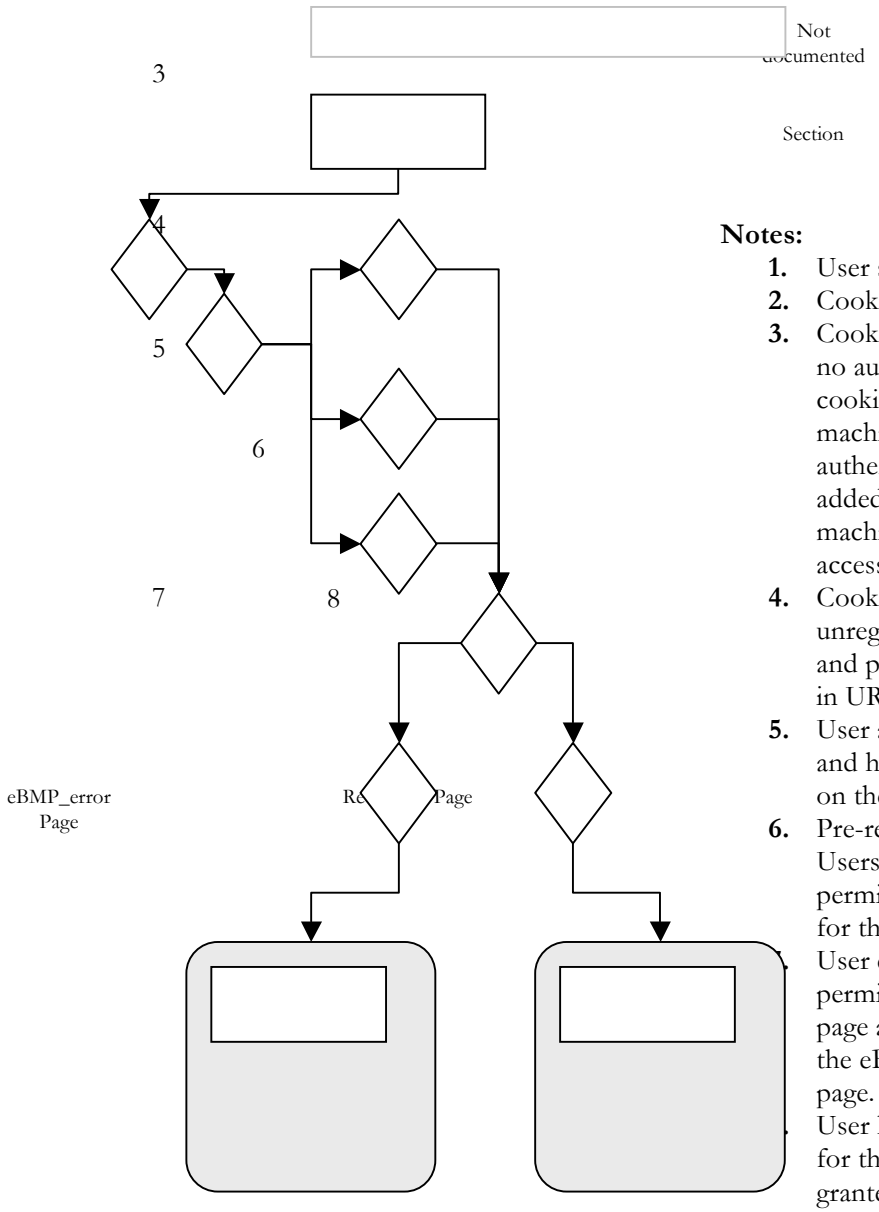
Some examples of the pages and work flow are shown further in this document.

1) BMP HOME PAGE



Notes:

1. User selects BMP Manual Content
2. User selects BMP Resources
3. User selects a featured story
4. User selects BMP Audits
5. User selects About BMP



Legend

Page

Decision Point

Not documented

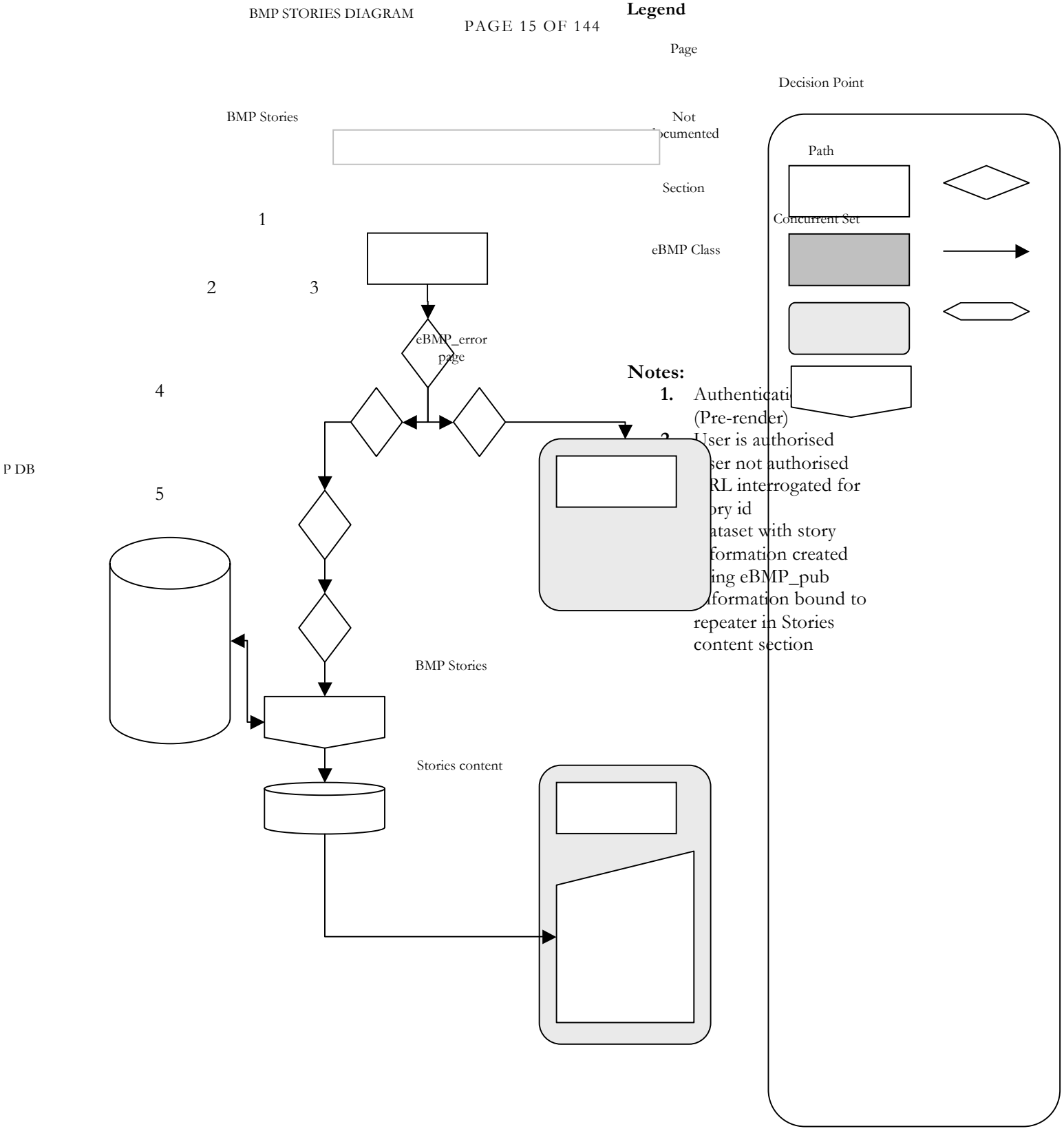
Path

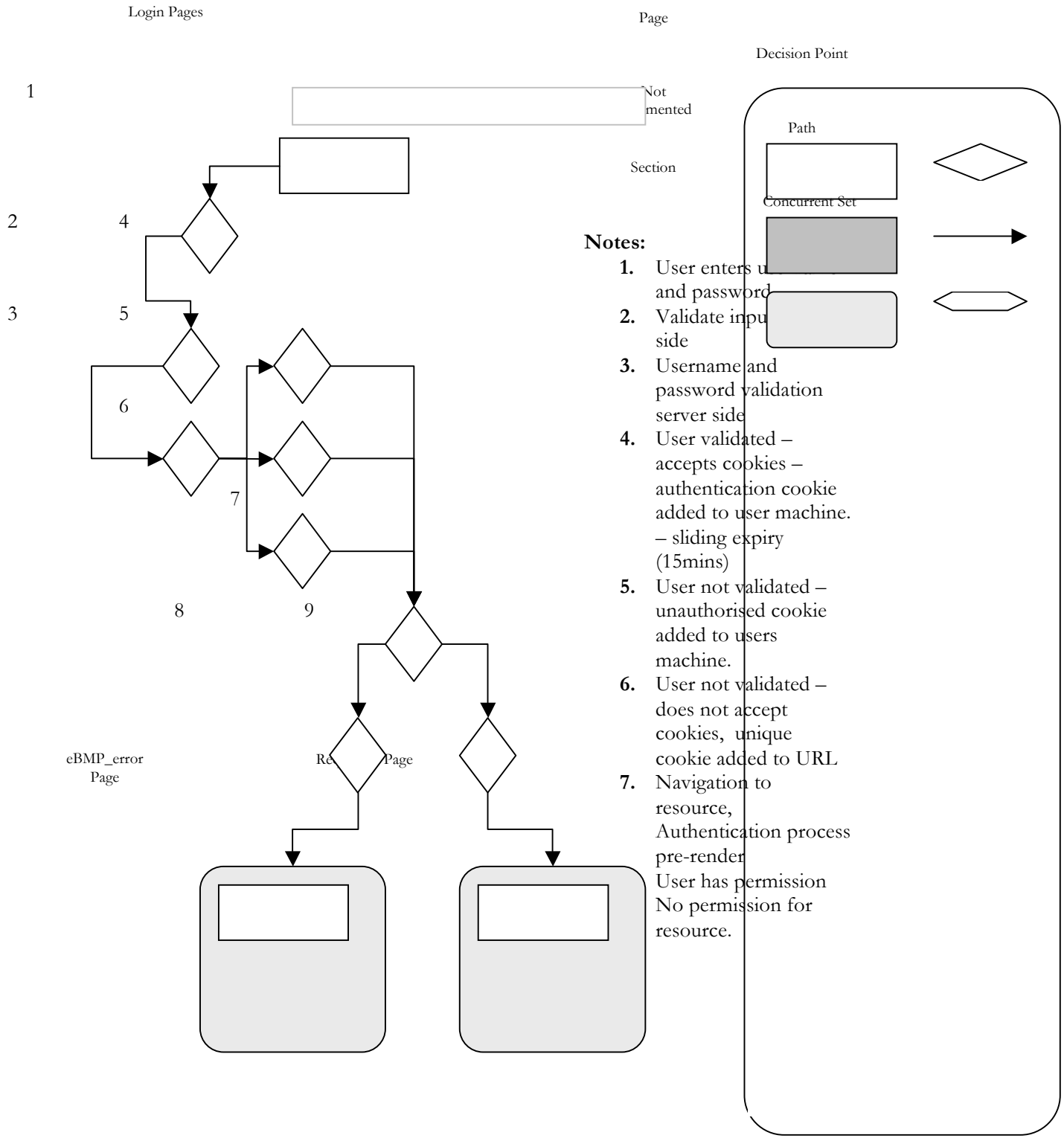
Section

Concurrent Set

Notes:

1. User selects a page
2. Cookie Check
3. Cookies enabled, no authenticated cookie found on users machine. Not authenticated cookie added to users' machine – unregistered access granted.
4. Cookie disabled, grant unregistered access and place cookie value in URL
5. User accepts cookies and has a valid cookie on their machine
6. Pre-render of page: Users role and permission is checked for the page
7. User does not have permission for the page and is directed to the eBMP_error.aspx page.
8. User has permission for the page and is granted access

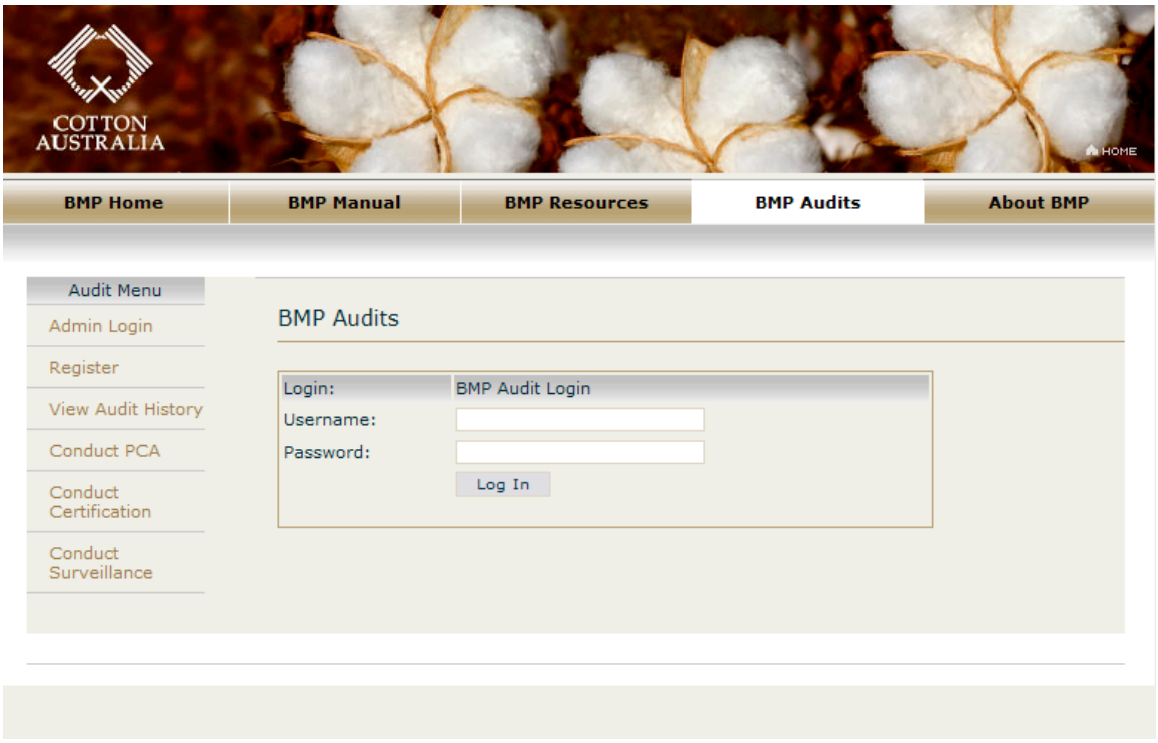

Legend
Page
Decision Point
BMP Stories
Not
Path
Section
Concurrent Set
1
eBMP Class
2
3
eBMP_error
page
Notes:
1. Authenticati
(Pre-render)
User is authorised
ser not authorised
RL interrogated for
ory id
ataset with story
formation created
ing eBMP_pub
formation bound to
repeater in Stories
content section
4
P DB
5
BMP Stories
Stories content



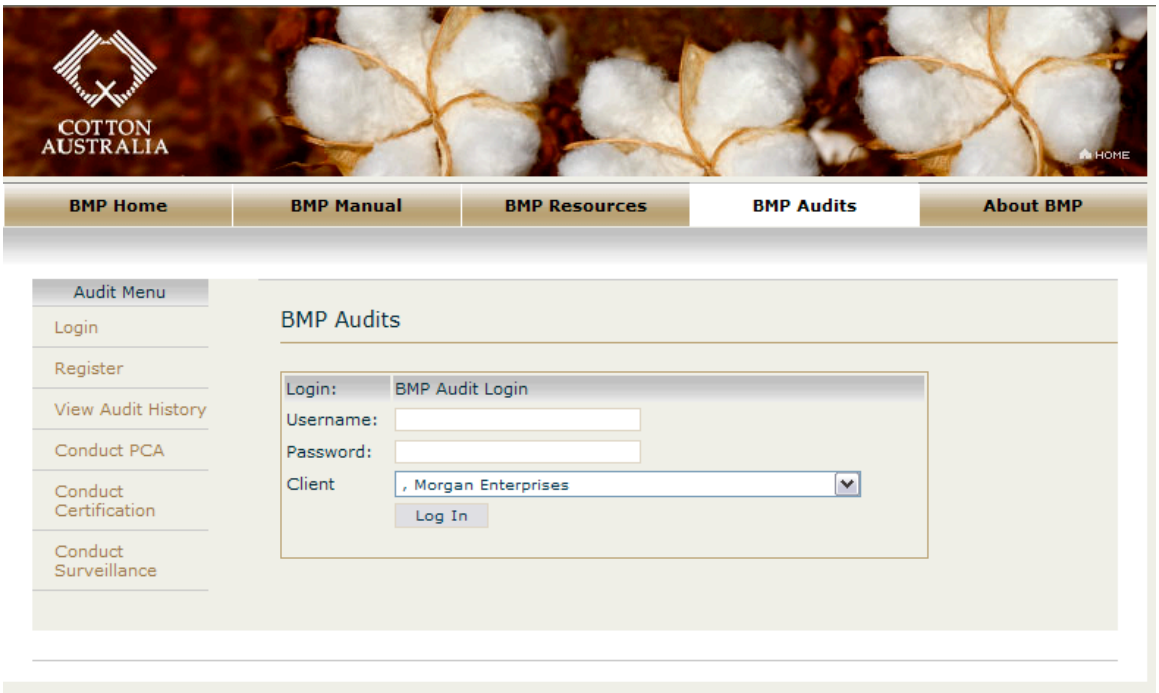
Notes:

1. User enters u and password
2. Validate inpu side
3. Username and password validation server side
4. User validated – accepts cookies – authentication cookie added to user machine. – sliding expiry (15mins)
5. User not validated – unauthorised cookie added to users machine.
6. User not validated – does not accept cookies, unique cookie added to URL
7. Navigation to resource, Authentication process pre-render
   User has permission
   No permission for resource.

BMP LOGIN PAGES – USER LOGIN



BMP LOGIN - ADMINISTRATIVE ACCESS PAGE



2) BMP MANUAL CONTENT PAGE(S)

BMP Home | BMP Manual | BMP Resources | BMP Contacts | About BMP

Search: Go

Module Menu

- Application of Pesticides
- Storage and Handling of Pesticides
- Integrated Pest Management
- Farm Design and Management
- Farm Hygiene
- Petrochemical Storage and Handling
- Land and Water Management

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Introduction

The Cotton BMP program is a voluntary program based on a process of continuous improvement. It uses a 'plan – do – check – review' management cycle and is best described as a functional Environmental Management System. It involves growers in a repeatable risk assessment and planning process that equips them with the means to address generic and farm specific environmental risks. The BMP Program also includes an audit component that ensures farm practices and procedures are regularly checked, and that any deficiencies are corrected.

The goals of the BMP Program are to see the development of a cotton industry:

- whose participants are committed to improving farm management practices;
- whose participants have developed and follow policies and farm management plans that minimise the risk of any adverse impacts on the environment or human health;
- Which can credibly demonstrate to the community stewardship in the management of natural resources and farming operations

The BMP Manual and Program was established following a research project investigating the impact of pesticides on the riverine environment (using the cotton industry as a case study), completed in the early 1990s. Following the research, a BMP Program was considered the best means to help cotton growers manage their operations in order to minimise the environmental risks associated with pesticide use.

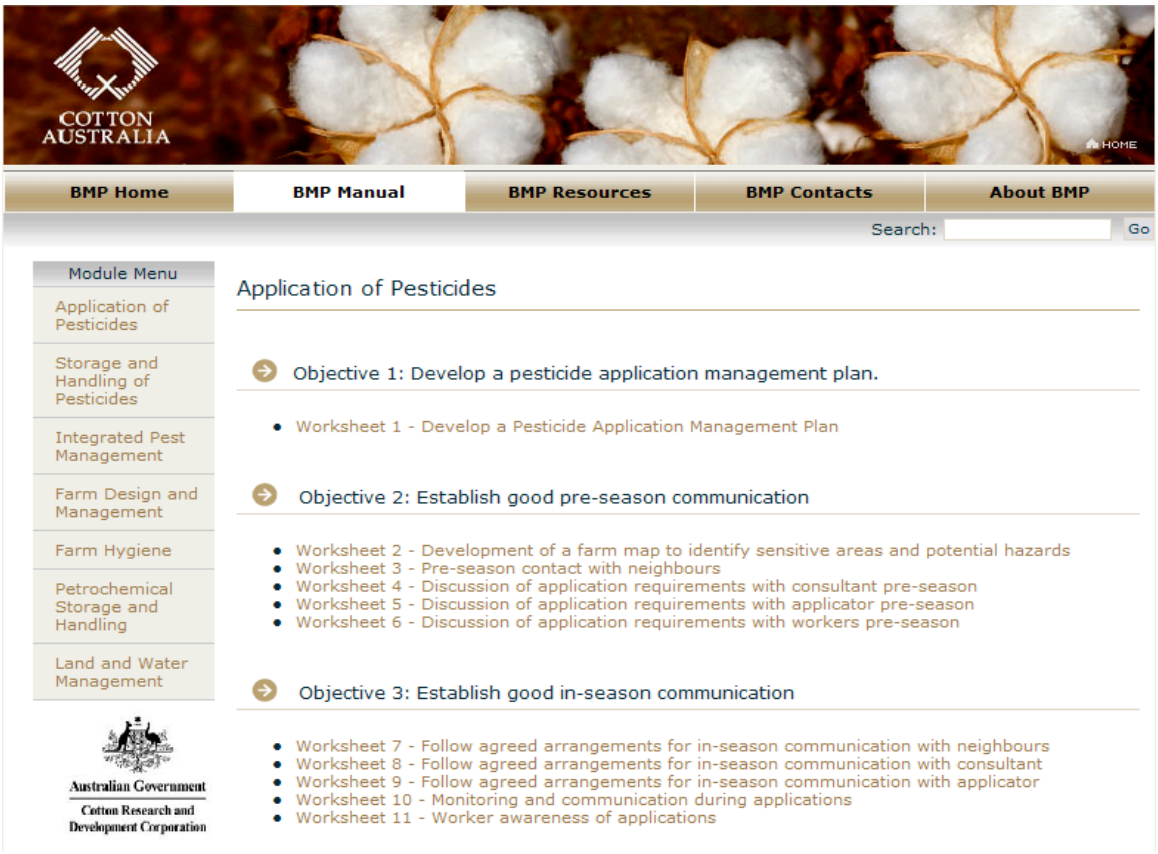
Current content of the BMP Manual

There are seven modules in the BMP Program. The five oldest modules in the current BMP manual were written in 2000, with some information updated in 2002. These core modules include:

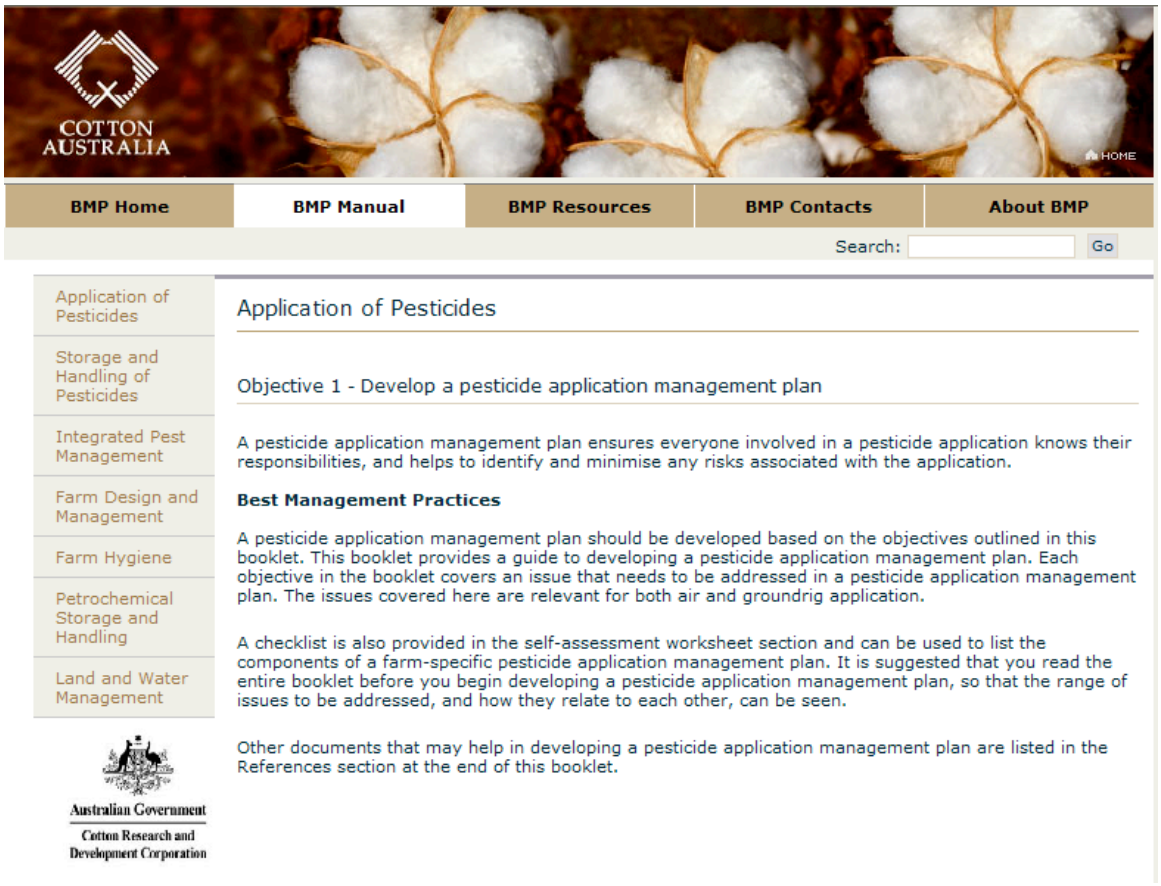
- Application of Pesticides,
- Storage and Handling of Pesticides,
- Integrated Pest Management,
- Farm Design and Management,
- Farm Hygiene.
- Petrochemical Storage and Handling
- Land and Water Management.

The first four modules formed the content of the first BMP Manual, released in 1997. In 2002, the Petrochemical Storage and Handling module was released, and the Land and Water Management module in 2005. In 2004, the industry BMP Committee resolved that the Petrochemical and Land and Water Management modules would be voluntary to include in certification audits for a period of three years, to allow time for growers to adopt, particularly those that hadn't yet started the Program and would be facing all 7 at once. From January 2008, certification to all seven modules will be required to be certified to the BMP Program.

BMP MANUAL CONTENT – WORKSHEET AND CONTENT INDEX



BMP MANUAL CONTENT



BMP MANUAL CONTENT – INDIVIDUAL WORKSHEET

BMP Home | BMP Manual | BMP Resources | BMP Contacts | About BMP

Search: Go

Module Menu

- Application of Pesticides
- Storage and Handling of Pesticides
- Integrated Pest Management
- Farm Design and Management
- Farm Hygiene
- Petrochemical Storage and Handling
- Land and Water Management

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Storage and Handling of Pesticides

Worksheet 20	Storage location?
Rank 1	The facility is a safe distance from: . sensitive areas, including watercourses, bodies of water and drains . houses and unrelated work places . the property boundary . areas used to store fuels, corrosive substances or gas cylinders The facility is on a site that is not prone to flooding The facility is on a level site (so that run-off from the site will not reach sensitive areas such as watercourses, bodies of water, nor move off the property)
Rank 2	The facility is a safe distance from: . sensitive areas, including watercourses, bodies of water and drains . houses and unrelated work places . the property boundary . areas used to store fuels, corrosive substances or gas cylinders The facility is on a site that is not prone to flooding
Rank 3	The facility is a safe distance from: . sensitive areas, including watercourses, bodies of water and drains . houses and unrelated work places
Rank 4	The facility is next to sensitive areas such as watercourses, bodies of water or drains and spills at the facility cannot be contained on-site Or Pesticides are stored in a work area used for other purposes Or The facility is next to the property boundary and spills at the facility cannot be contained on-site Or The facility is on a site that is flood prone
Other Information:	
Records:	Pesticide application management plan, notes of pre-season meetings (e.g. farm diary)
Implementation Templates and Links	Storage and Handling of Pesticides

TIER 2: BUSINESS CLASSES

The eBMP business classes are a set of classes that enable the application(s) to interact with the data source and the front-end (User-interface). A list of these is outlined below. These classes are also shown in full detail in Appendix 2 of this document.

EBMP CLASSES

▪ ebmp_object_type	▪ ebmp_object
▪ ebmp_role_object	▪ ebmp_role
▪ ebmp_login_role	▪ ebmp_login
▪ ebmp_contact	▪ ebmp_cyf
▪ ebmp_scyf	▪ ebmp_session
▪ ebmp_pracsess	▪ ebmp_prac
▪ ebmp_pracgroup	▪ ebmp_sessiontype
▪ ebmp_year	▪ ebmp_region
▪ ebmp_farm	▪ ebmp_farm_paddock
▪ ebmp_paddock	▪ ebmp_paddock_bale
▪ ebmp_bale	▪ ebmp_action
▪ ebmp_audit	▪ ebmp_audittype
▪ ebmp_auditq	▪ ebmp_auditver
▪ ebmp_error	▪ ebmp_connection
▪ ebmp_cookies	▪ ebmp_pub

TIER 3: DATA ACCESS AND STORAGE

A MS SQL 2000 server database is used to store the BMP manual content, audits and user information.

Data management is achieved using the relational database MS SQL 2000 Server. The database consists of some 30 tables. The draft design of the database as well as the relationships is shown in Appendix 1 of this document.

WINDOWS EBMP APPLICATION

One of the shortfalls in establishing an electronic auditing system is that in the field auditors and GSM's rarely have "practical" access to an internet connection (broadband or otherwise).

To overcome this aspect the eBMP project has included the windows application that runs locally stored content. The application still retains the ability to interact with live web content.

Local content updates are run when the user accesses the eBMP website, which performs the appropriate updates on the eBMP database.

The windows application is separated into a 3 tier model, similar to the web application.

USER REQUIREMENTS

Microsoft Word 2000 or greater. (For exporting of reports to word)

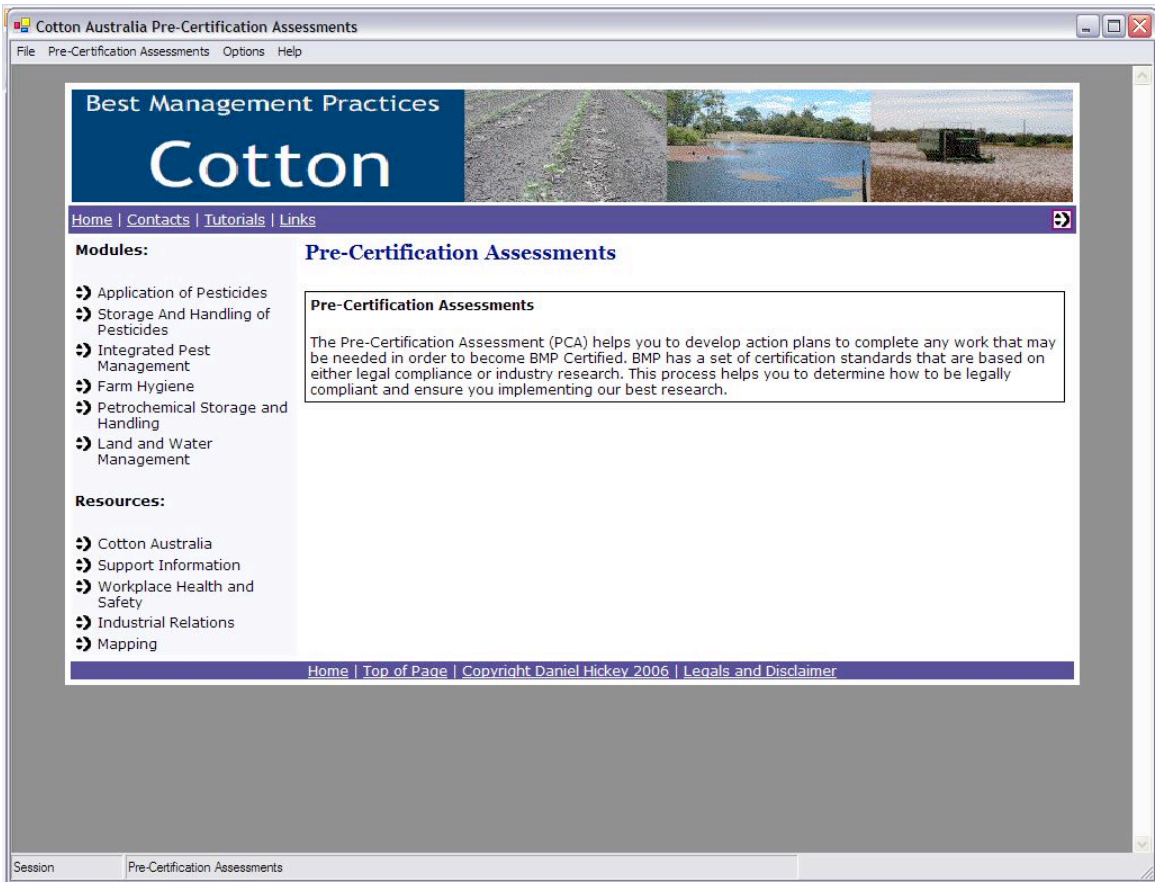
TIER 1 USER INTERFACE

The user interface consists of a number of forms that enable the user to interact with the content and perform auditing and reporting functions.

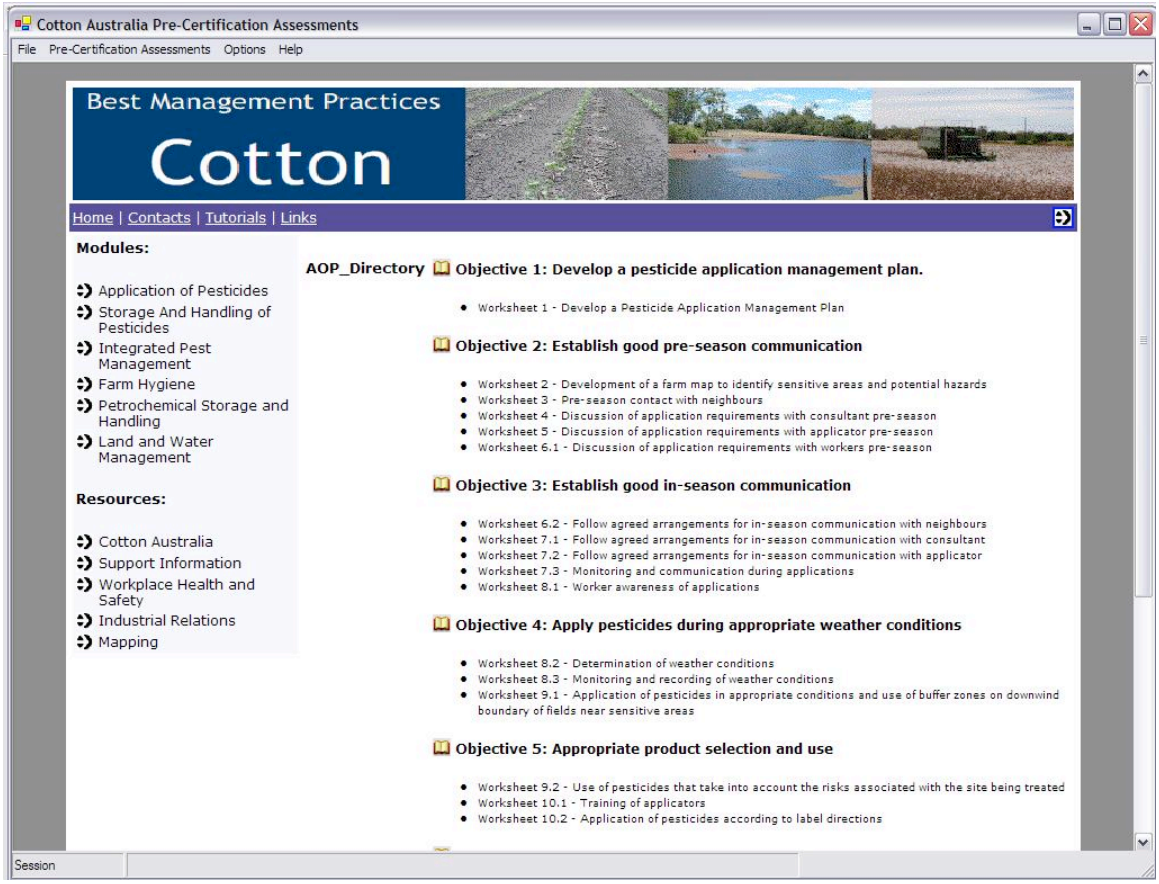
1) Main Application Form
2) Audit Form
3) Comments, Action Plans and Non-Conformance Form.
4) Export Audit Form
5) Reports Form: Form for accessing BMP report information about local sessions.

BMP MAIN FORM

This form encloses a web browser for viewing BMP content. The application is able to interact with the content by querying what links the user has clicked onto. It then queries the database as to what action it should perform.

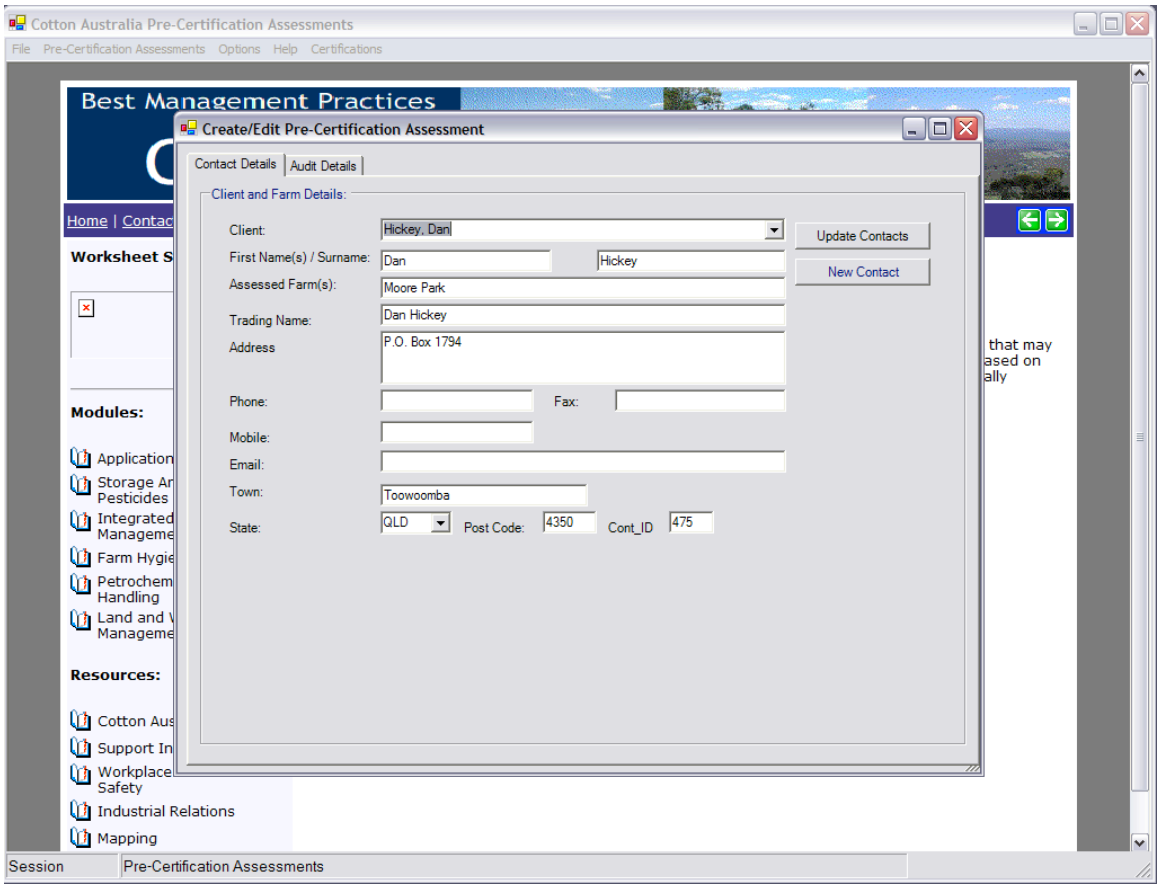


BMP MAIN FORM - BMP CONTENT

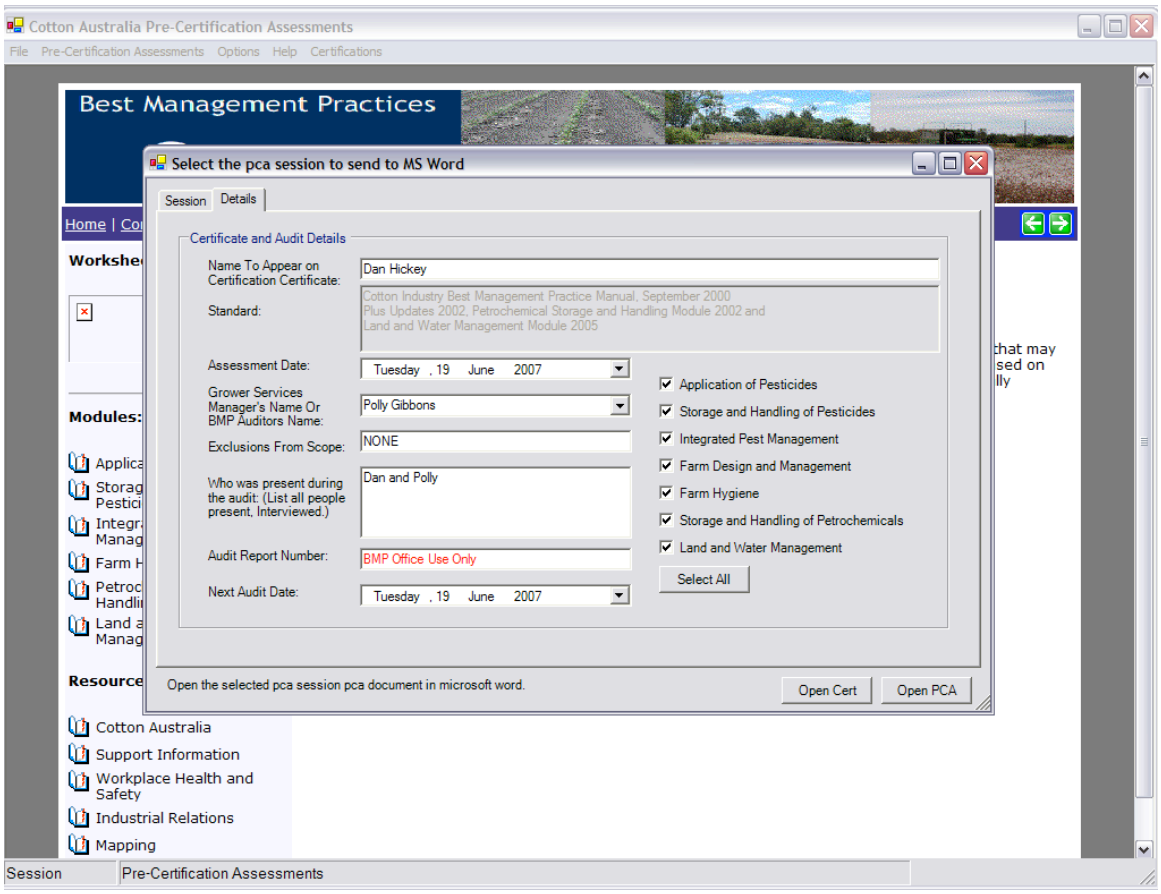


BMP AUDIT FORM

Collects the information for the person being audited (Pre-Certification, Certification and Annual Self Assessment Declarations) and creates a new session to add the database.



EXPORT AUDIT REPORT FORM



TIER 2 BUSINESS OBJECTS

Tier 2 describes the objects and classes used/required to enable the system to function

Class Name:	*Class Description*
eBMP_login	Manages the addition, updating, selection and deleting of all t_login records from the database
eBMP_login_role	Manages the addition, updating, selection and deleting of all t_login_role records from the database
eBMP_role	Manages the addition, updating, selection and deleting of all t_role records from the database
eBMP_role_object	Manages the addition, updating, selection and deleting of all t_role_object records from the database
eBMP_object	Manages the addition, updating, selection and deleting of all t_object records from the database
eBMP_contact	Manages the addition, updating, selection and deleting of all t_contact records from the database
eBMP_contact_year_farm	Manages the addition, updating, selection and deleting of all t_contact_year_farm records from the database
eBMP_year	Manages the addition, updating, selection and deleting of all t_year records from the database
eBMP_farm	Manages the addition, updating, selection and deleting of all t_farm records from the database
eBMP_region	Manages the addition, updating, selection and deleting of all t_region records from the database
eBMP_scyf	Manages the addition, updating, selection and deleting of all t_scyf records from the database
eBMP_session	Manages the addition, updating, selection and deleting of all t_session records from the database
eBMP_session_type	Manages the addition, updating, selection and deleting of all t_session_type records from the database
eBMP_pub_session	Manages the addition, updating, selection and deleting of all t_pub_session records from the database
eBMP_pub	Manages the addition, updating, selection and deleting of all t_pub records from the database
eBMP_pub_group	Manages the addition, updating, selection and deletion of all t_pub_group records from the database.
eBMP_t_audit	Manages the addition, updating, selection and deletion of all t_audit records from the database
eBMP_word	Manages the importing of data into a dataset from a PCA, certification or ASAD Microsoft Word document.
eBMP_io	Contains string and file manipulation functions and routines commonly needed.
eBMP_connection	Manages connection to MS Access database
eBMP_permissions	Manages user authentication on each request to a page, database or other object.

CONCLUSION

The main outline of the eBMP design has been shown in this document. As stated previously this document is not static. User testing of the draft version will give the users feedback on any additions or changes to be made within the scope of the project.

APPENDICES

APPENDIX 1 – DRAFT DATABASE DESIGN